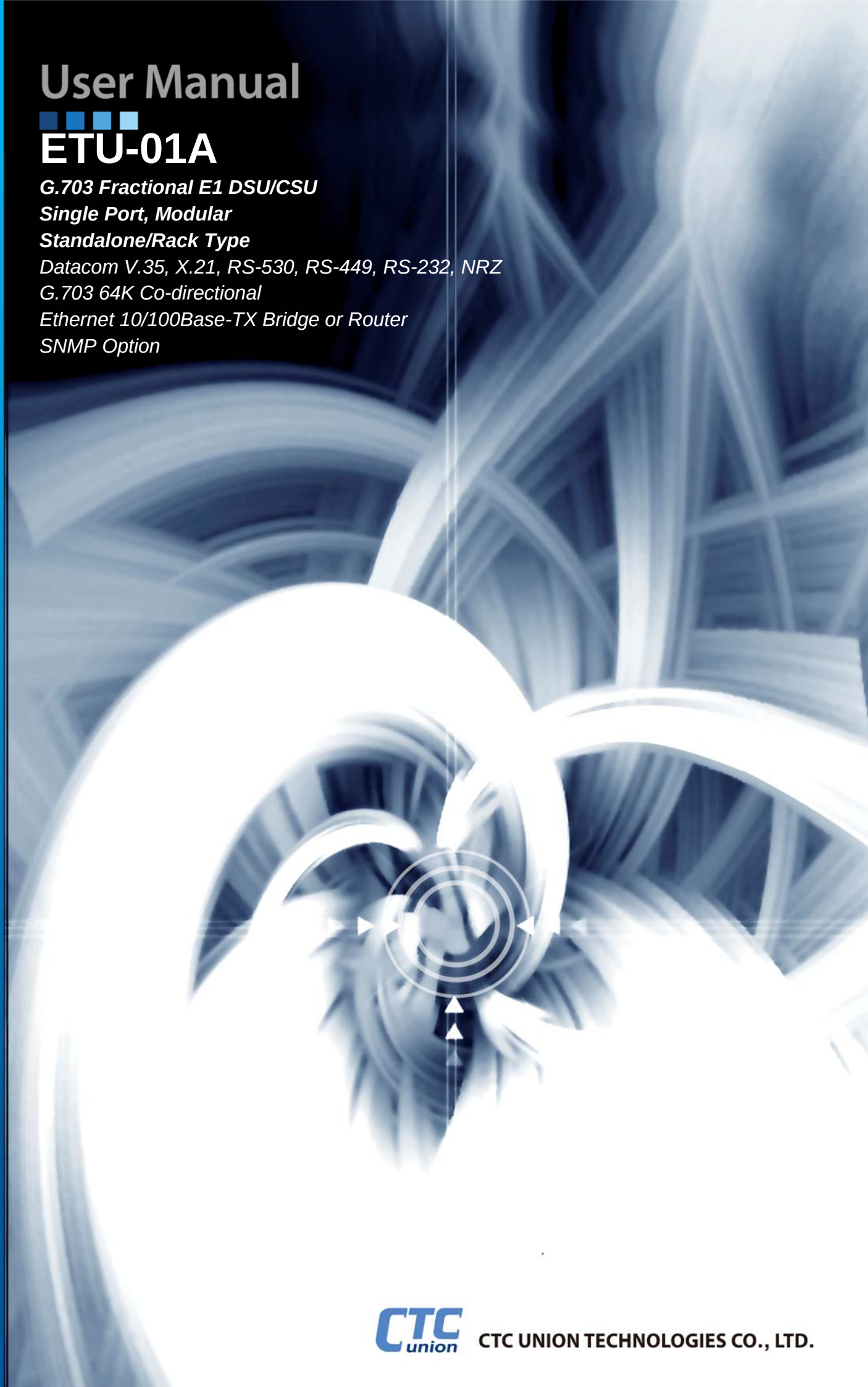
User Manual

ETU-01A

G.703 Fractional E1 DSU/CSU
Single Port, Modular
Standalone/Rack Type
Datacom V.35, X.21, RS-530, RS-449, RS-232, NRZ
G.703 64K Co-directional
Ethernet 10/100Base-TX Bridge or Router
SNMP Option



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WARNING:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause harmful interference in which case the user will be required to correct the interference at his own expense. NOTICE: (1) The changes or modifications not expressively approved by the party responsible for compliance could void the user's authority to operate the equipment. (2) Shielded interface cables and AC power cord, if any, must be used in order to comply with the emission limits.

CISPR PUB.22 Class A COMPLIANCE:
This device complies with EMC directive of the European Community and meets or exceeds the following technical standard. EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment. This device complies with CISPR Class A.

WARNING:
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CE NOTICE
Marking by the symbol CE indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards: EN 55022:1994/A1:1995/A2:1997 Class A and EN61000-3-2:1995, EN61000-3-3:1995 and EN50082-1:1997

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ETU-01A
Single Port G.703 Fractional E1 DSU/CSU with Modular I/F and SNMP option.

User Manual
Version 3.11 May 2011 Updated Release

This manual supports the following models:
ETU-01A/AC
ETU-01A/DC
ETU-01A/AD (Dual AC+DC)

This document is an updated release manual. Please check CTC Union's website for any newer update manual or contact us by E-mail at info@ctcu.com. Please address any comments for improving this manual or to point out omissions or errors to marketing@ctcu.com. Thank you.

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Chapter 1. Introduction

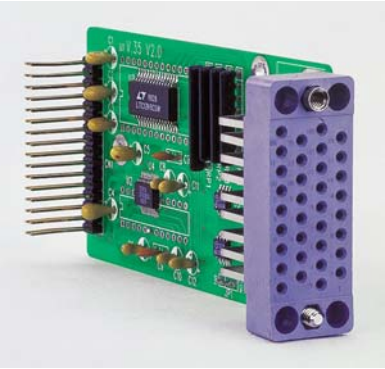
1.1 General

The ETU-01A provides an economical digital access solution for E1 and Fractional E1 network services. User replaceable Data I/F Modules provide a wide range of industry standard interfaces to DTE devices, which may be linked to an ETU-01A at data rates of 56Kbps to 2048Kbps.

The ETU-01A supports local control and diagnostics via the LCD display, keypad and LED status indicators located on the front panel, via the RS-232 control port connection or via optional SNMP. The SNMP option provides Simple Network Management Protocol System functions over a 10BASE-T connection, which allow the user to remotely control, diagnose, and monitor the system. These features enable users to easily configure the unit, execute the loop back/BERT functions and monitor the network status either locally or remotely.

The ETU-01A operates from 90~250VAC, 18 to 72VDC or with a dual power model, both AC and DC. The unit is built in a compact case that can be placed on desktops and shelves or installed, by means of an appropriate adapter, in a 19" EIA rack.

At the time of this printing, the ETU-01A has nine types of user-replaceable data channel modules.



1. ETU/TTU-V35
   V.35 Module:
Provides one fully compliant ITU-T V.35 interface on a Female "M" block (Winchester), 34 pin connector. Operates at any n56/n64 fractional or unframed E1 speed.

2. ETU/TTU-530
   RS-530 Module:
Provides one fully compliant EIA RS-530 interface on a female "D-Sub" type 25 pin connector. Operates at any n56/n64 fractional or unframed E1 speed.

3. ETU/TTU-449

RS-449 Module:

Provides one fully compliant EIA RS-449 interface by placing an adapter cable on the ETU/TTU-530 module and providing a male "D-Sub" type 37 pin connector. Operates at any n56/n64 fractional or unframed E1 speed.

4. ETU/TTU-X21

X.21 Module:

Provides one fully compliant ITU-T X.21 interface on a female "D-Sub" type 15 pin connector. Operates at any n56/n64 fractional or unframed E1 speed.

5. ETU/TTU-ET10/100

Ethernet Bridge Module:

Provides an Ethernet (IEEE802.3u) Bridge function over the WAN when matched to another ET100 module, ET100 standalone, or a compatible bridge utilizing standard HDLC (ISO 13239) protocol. The interface connection is a shielded RJ-45 connector for 10/100Base Ethernet and auto-MDIX. Operates at any n56/n64 fractional or unframed E1 speed.

6. ETU/TTU-232

RS-232 Module:

Provides one fully compliant EIA RS-232 SYNC interface on a female "D-Sub" type 25 pin connector. Operates at n56/n64 fractional E1 speed up to 128Kbps (ASYNC 19.2K).

7. ETU/TTU-G64

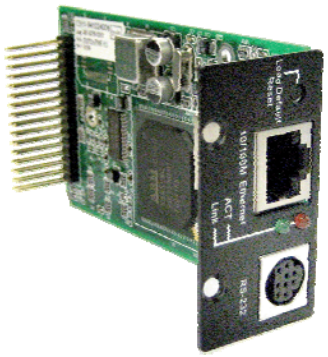
G.703/64K Module:

Provides one fully ITU-T compliant G.703 Codirectional (line code) 64Kbps interface on a female "D-Sub" type 15 pin connector. Operates at 64Kbps only.

8. ETU/TTU-NRZ
NRZ Module:

Provides one NRZ interface on four (4) female BNC type connectors. Operates at any n56/n64 fractional or unframed E1 speed.

9. ETU/TTU-ET100R
Ethernet Router Module:



Provides an Ethernet (IEEE802.3 or IEEE802.3u) Router function over the WAN when matched to another ET100R module or a compatible router under PPP, HDLC or cHDLC (Cisco) protocol. The interface connection is a straight (MDI) 10/100BASE-TX Ethernet on a shielded RJ-45 connector. Configuration is via RS-232 terminal, Telnet, or web based GUI interface. Operates at any n56/n64 fractional or unframed E1 speed.

1.2 Functional Description

The ETU-01A is a single port access unit for E1, Fractional E1 or Fractional cascade (multiplexing) E1 services. The ETU-01A data channel supports user-selectable transmission rates, which are integral multiples of 56 or 64Kbps, up to a maximum 2.048Mbps. E1 services operate on a line attenuation of up to 43 dB on twisted pair or coax cable, providing an approximate operating range of up to 2Km (using 22AWG wire).

The ETU-01A packs the data channel into user defined E1 link time slots. The unused time slots may have IDLE code inserted (in frame mode) or have the receive side time slots' data inserted (in cascade mode).

The ETU-01A has nine types of user data channel modules: V.35, X.21, RS-530, RS-232, RS-449, G.703/64K Co-directional, NRZ/BNC, 10/100BASE-TX Bridge and 10/100BASE-TX Router. The desired interface is achieved by installing the appropriate type of channel module in the ETU-01A. The ETU-01A supports flexible time slot assignment, allowing the user to specify the selection of time slots. The ETU-01A fully meets all of the E1 specifications including ITU-T G.703, G.704, G.706, G.732, and G.823.

The ETU-01A features V.54 loop back capabilities for performing local analog loop back and remote digital loop back as well as progressive BERT testing. The operator at either end of the line may test both the ETU-01A and the line in the remote digital loop back mode. The loop back is controlled by local LCD display setting, serial console, optional SNMP or by the DTE interface for V.35, RS-232 and RS-530.

When loop back is selected from the LCD menu system, the unit generates one of fourteen different test patterns, according to ITU, for direct end-to-end integrity testing. The Error indicator flashes for each bit error detected.

Multiple clock source selection provides maximum flexibility in connecting both the E1 and user data interface. The E1 link may be clocked from the recovered receive clock, from the user data port or from the internal oscillator.

1.3 System Timing Considerations

The ETU-01A has the flexibility to meet the timing requirements of various system configurations. The timing mode for the E1 link and the user channel is selected through the LCD menu system, a serial console or via optional SNMP management.

Master timing

The ETU-01A E1 link receive path always operates on the receive clock. The ETU-01A recovers the receive clock from the received E1 link data signal. The source of the ETU-01A E1 link transmit clock may be selected by the user. The following E1 link transmit timing modes are available:

Recovery timing:
The ETU-01A E1 link transmit clock is locked to the recovered receive clock. This is usually the timing mode selected for network operation.

Internal timing:
The ETU-01A E1 link transmit clock is derived from the internal clock oscillator. This timing mode is necessary in point-to-point applications over leased line. In this case, one ETU-01A must use the internal oscillator, and the other may operate from the recovered clock.

The ETU-01A has three data channel clocking modes:

Clock mode DTE1: The ETU-01A data channel accepts the user transmit clock from the connected DTE (from the ETC pin) and provides a receive clock (Transparent timing) to the synchronous equipment connected to the data channel.

Clock mode DTE2: The ETU-01A data channel accepts the user transmit clock (from ETC pin) and receive clock (from ERC pin) provided by the DTE equipment connected to the data channel. Note: The X.21 data channel cannot be operated in this mode.

Clock mode DTE3: The ETU-01A data channel operates as a DCE and accepts both the user transmit and receive clock (All from ETC pin) provided by the DTE equipment connected to the data channel.

1.4 Typical System Applications

General

In a typical application (Figure 1-1), the ETU-01A is used in a point-to-point connection. The synchronous data channels of each host are connected over an E1 line.

Figure 1-1 Point-to-Point Application

Fractional E1 data service is based on the assumption that the user data rate is a fraction of the available E1 bandwidth, in multiples of 56K or 64K.

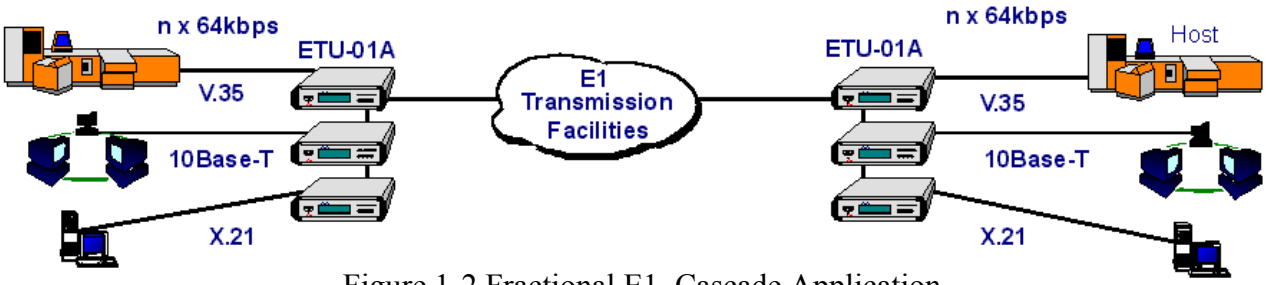


Figure 1-2 Fractional E1, Cascade Application

In the above figure, the available E1 Time Slots are divided (Fractional E1) and cascaded (multiplexed). Various data interfaces are employed in each ETU-01A to provide connections between hosts, LANs and servers across the E1 transmission facility.

1.5 E1 signal structure

The E1 line operates at a nominal rate of 2.048Mbps. The data transferred over the E1 line is organized into frames, with each E1 frame containing 256 bits. The 256 bits are a total of the 32 time slots, each containing eight bits, carrying the data payload.

E1 transmission utilizes two main types of framing: Frame Alignment Signal (FAS) and Multi-Frame Alignment Signal (MFAS). Framing is necessary in order for equipment receiving the E1 signal to be able to identify and extract the individual channels. PCM-30 (CAS) transmission system use MFAS framing along with the FAS framing. PCM-31 (CCS) transmission system use only FAS framing.

Frame Alignment Signal (FAS)

The 2.048 Mbps frame consists of 32 individual time slots (numbered 0-31). As described previously, each time slot consists of an individual 64Kbps channel of data. In the FAS format, time slot 0 of every other frame is reserved for the frame alignment signal pattern. Alternate frames contain the FAS Distant Alarm indication bit and others bits reserved for national and international use.

Multi-Frame Alignment Signal (MFAS)

MFAS framing uses Channel Associated Signaling (CAS) to transmit A/B/C/D bit signaling information for each of 30 channels. This method uses the 32 time slot frame format with time slot 0 for the FAS and time slot 16 for the Multi-Frame Alignment Signal and the Channel Associated Signaling.

1.6 E1 line signal

The basic E1 line signal is coded using the Alternate Mark Inversion (AMI) or HDB3 rule.

In the AMI format, "ones" are alternately transmitted as positive and negative pulse, whereas "zeros" are transmitted as a zero voltage level. AMI is not used in most 2.048Mbps transmissions because synchronization loss occurs during long strings of data zeros.

HDB3 (High Density Bipolar of order 3 code) is a telecommunications line code mainly used in Japan, Europe and Australia and is based on AMI. It is also very similar to the B8ZS encoding used in T-1 lines. In the HDB3 format, a string of four consecutive zeros is replaced with a substitute string of pulses containing an intentional bipolar violation. The HDB3 code substitutions provide high pulse density so that the receiving equipment is able to maintain synchronization with the received signal.

E1 link line coding

The ETU-01A supports two E1 line codes:

AMI coding.

HDB3 coding.

E1 framing formats

The ETU-01A supports five frame formats:

Unframed

FAS (CCS, PCM-31)

FAS (CCS, PCM-31) + CRC4 (PCM-31C)

MFAS (CAS, PCM-30)

MFAS (CAS, PCM-30) + CRC4 (PCM-30C)

1.7 Technical Specifications

E1 link

Framing	-Unframed/Framed -CCS (PCM31)/CAS (PCM30) -CRC4 ON/OFF
Bit Rate	2.048 Mbps
Line Code	-AMI -HDB3
Line Impedance	-75 ohms -120 ohms
Relative Receive Level	0 to -43dB (long haul)
"Pulse" Amplitude	-Nominal 2.37V±10% for 75 ohms -Nominal 3.00V±10% for 120 ohms
"Zero" Amplitude	±0.1V
Transmit Frequency Tracking	
Internal Timing	±30 ppm
Loopback Timing	±200 ppm
External Timing	±200 ppm
Jitter Performance	According to ITU-T G.823
Complies With	ITU-T G.703, G.704, G.706 and G.732
Interface Connectors	-15-pin, D-type Female (DB15 to RJ-45 adapter optional) -BNC

User Data Channels

Interface Types	-V.35, X.21, RS-530, RS-449, RS-232, -G.703/64K Co-directional, NRZ/BNC, -10Base-T Bridge, and 10/100Base-T Router
I/F Connectors	
V.35 I/F	34 pin, M-block Female
X.21 I/F	15 pin, D-type Female
RS-530 I/F	25 pin, D-type Female
RS-449 I/F	37 pin, D-type Male (adapter cable on RS-530)
RS-232 I/F	25 pin, D-type Female
G.703/64K I/F	15 pin, D-type Female
NRZ Interface	BNC Female (4)
Bridge I/F	RJ-45
Router I/F	RJ-45
Line Code	NRZ (G.703/64K is Co-directional line code)
Data Rate	n×56kbps or n×64kbps where n equal 1 to 31 in CCS and n equal 1 to 30 in CAS
Clock Modes	
RECOVERY	Receive and transmit clock (recovered) to the synchronous DTE
INT OSC	Receive and transmit clock (internal oscillator) to the synchronous DTE
DTE1 (Transparent)	Receive clock to the synchronous, and transmit clock from the synchronous device
DTE2	Receive and transmit clock from the synchronous DCE (from ETC and ERC pin)
DTE3	Receive and transmit clock from the synchronous DCE (all from ETC pin).
Control Signals	-CTS ON, or follows RTS -DSR constantly ON, except during test loops -DCD constantly ON, except during signal loss
Time slot allocation	User defined

Setup/Configuration

LCD Display	2 rows of 16 Characters
Pushbutton Switches	-ESC
	-Left Arrow
	-Right Arrow
	-Enter

LED indicators

POWER	Green	Power
Sig Loss	Red	E1 link signal loss
SYNC Loss	Red	E1 link sync loss
Alarm	Red	E1 link alarm, include: BPV error / CRC4 error / Frame slip / All ones(AIS) / Remote alarm
TD	Yellow	Transmit data (data port)
RD	Yellow	Receive data (data port)
Error	Red	Bit errors
Test	Red	Loop back and BERT test active

Physical

Height:	45 mm
Width:	195 mm
Depth:	255 mm
Weight:	1.5 kg

Diagnostic tests

Test loops	-E1 local analog loop back -E1 local digital loop back -E1 local payload loop back -E1 remote analog loop back -E1 remote payload loop back -Data port local analog loop back -Data port local digital loop back -Data port V.54 loop back
BERT test pattern	-511 -2047 -2^15-1 -2^20-1 -QRSS -2^23-1 -All ones -All zeros -ALT -Double ALT (11001100….) -3 in 24 -1 in 16 -1 in 8 -1 in 4

RS-232 Console port

Port interface	V.24/RS-232 asynchronous (DCE)
Port connector	9 pin D-type female
Data rate	300, 1200, 2400, 4800, 9600, or 19200 bps 9600 default
Data format	-One start bit -8 data bits -No parity -One stop bits -No flow control

Power supply

Voltage	AC Model: 90 ~ 250 VAC (universal switching type)
	DC Model: 18 to 72 (-18 to -75VDC)
	AD Model: Both AC and DC dual power model
Frequency	47 to 63 Hz for AC power
Power consumption	< 15 Watts
Fuse	0.5A slow blow

Environment

Temperature	0-60°C / 32-140°F
Humidity	0 to 90% non-condensing

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Chapter 2. Installation

2.1 General

This chapter provides detailed instructions for mechanical installation of the ETU-01A. Following the completion of installation, please refer to Chapter 3 for operating information.

2.2 Site Preparation

Install the ETU-01A within reach of an easily accessible grounded AC or DC (48V) outlet. The outlet should be capable of furnishing 90 ~ 250 VAC or 18VDC to 72VDC for DC model unit. The AD model supports AC plus DC power simultaneously for redundant 1+1 power operation. Allow at least 10 cm (4 inch) clearance at the rear of the ETU-01A for power, signal lines and interface cables.

2.3 Mechanical Assembly

The ETU-01A is designed for tabletop or bench installation, and is delivered completely assembled. No provision has been made for bolting the ETU-01A to a tabletop. An optional 19" rack mount adapter is available.

2.4 Electrical Installation

2.4.1 Power connection

AC power is supplied to the ETU-01A through a standard (IEC C14) 3-prong plug. (Refer to Figure 2-1) The ETU-01A should always be grounded through the protective earth lead of the power cable.

The line fuse is located in an integral-type fuse holder on the rear panel. Make sure that only fuses of the required rating are used for replacement. Do not use repaired fuses or short-circuit the fuse holder. Always disconnect the power cable before removing or replacing the fuse.

DC power is supplied to the ETU-01A through a three pin terminal block. (Refer to Figure 2-2) The ETU-01A should always be grounded through the 'Frame Ground' terminal in DC applications.

2.4.2 Rear panel connectors

Please refer to the User Data Channels table on page 10 for a description of the digital interface connectors located on the rear panel of the ETU-01A (Refer to Figure 2-1). The E1 line connectors incorporate DB15 pin (AT&T PUB 62411) for balanced 120 ohm connections on twisted pair cable or two BNC Coax connectors for 75 ohm unbalanced connection on coaxial cable. (Appendix A provides detailed information on the various interface modules and connectors).

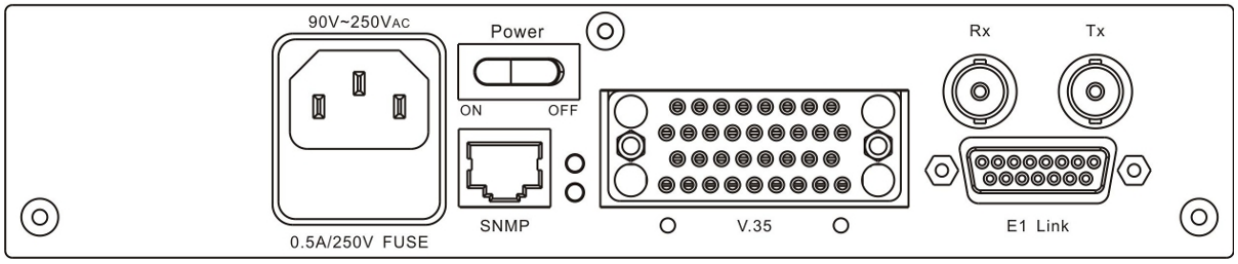


Figure 2-1 ETU-01A AC rear panel, Option: DCE (V.35)

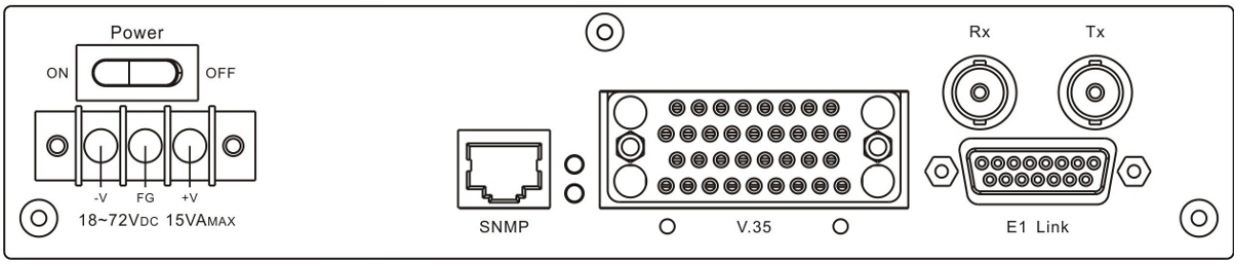


Figure 2-2 ETU-01A DC rear panel, Option: DCE (V.35)

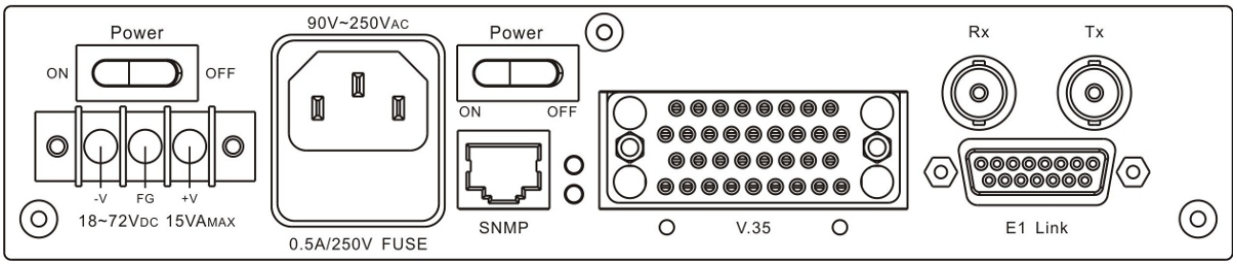


Figure 2-3 ETU-01A AC+DC rear panel, Option: DCE (V.35)

2.5 E1 Line side

DB-15 Connector (balanced 120 Ohm)

The pin assignment for DB-15 connector follows AT&T Pub 62411:

Pin:	Function:
E1 Link	
1	TTIP (Transmit data out)
9	TRING (Transmit data out)
3	RTIP (Receive data in)
11	RRING (Receive data in)
ALARM relay contact	
7	common
8	NO (normally open)
15	NC (normally closed)

BNC coax connectors (unbalanced 75 Ohm)

Two BNC coax connectors marked RX and TX (Same function as the E1 line DB15 connector).

2.6 Data port side

2.6.1 V.35 interface connector

Utilizes standard V.35 pin-out. The three test pins have been chosen for loops and test. For applications using a V.35 interface, clock mode is selected DTE2, connect the ERC input clock to pins Z(A) and BB(B).

2.6.2 X.21 interface connector

For applications using an X.21 interface external clock (Clock mode select DTE1 or DTE3), connect the input clock to pins 7(A) and 14(B) of the 15-pin connector.

2.6.3 RS-530 interface connector

Utilizes standard pin-out. The three test pins have been chosen for loops and test. For applications using an RS-530 interface, clock mode is selected DTE2, connect the ERC input clock to pins 20(A) and 23(B).

2.6.4 RS-232 interface connector

Appendix A.5 describes the interface connection for RS-232.

2.6.5 RS-449 interface connector

Appendix A.6 describes the cabling connection between the RS-530 interface and the RS-449.

2.6.6 G.703/64K Interface connector

Appendix A.7 describes the cabling connection for the G.703/64K interface.

2.6.7 NRZ/BNC Interface connector

Appendix A.8 describes the cabling connection for the NRZ/BNC interface.

2.6.8 ET100 10/100BASE-TX Interface connector

Appendix A.9 describes the cabling connection and DIP switch settings for the Ethernet Bridge interface.

2.6.9 ET100R 10/100BASE-TX Interface connector

The Ethernet connection for the ET100R module is a standard MDI, shielded RJ-45. A separate electronic manual (in PDF format) is provided with this module to cover setup and configuration of the router functions.

Notice: Cable and Termination

Use a shielded twisted pair cable between the ETU-01A and the DTE device. The receivers on the ETU-01A are 100 Ohm terminated (For X.21 and RS-530). If problems are encountered with the connection to the DTE interface, make sure that the DTE interface is terminated correctly.

2.7 DIP Switches and Jumper Settings

2.7.1 Caution

To avoid accidental electric shock, disconnect the ETU-01A power cord before opening the cover. Access inside the equipment is only permitted to authorized and qualified service personnel.

2.7.2 Procedure

1. Turn power OFF, Disconnect the power cord from the AC mains.
2. Loosen the screws at the left/right of the rear panel.
3. Remove the PCB assembly, noting orientation for installation.
4. Adjust the DIP switches and jumpers as required, according to table 2-1.
5. Replace the PCB and tighten the screws.

Table 2-1

DIPSW1

Item	Function	Setting	Factory Setting
1	E1 line impedance set 120 Ohm	ALL OFF	*
2	E1 line impedance set 75 Ohm	ALL ON	

This is the only internal DIP switch setting required for the ETU-01A. All other settings are performed through LCD or Console user interface.

Chassis GND Jumper

Set this jumper to "CON" to connect logic ground to chassis. Set to "DIS" to separate logic and chassis grounds. The default and normal position is disconnected.

Please refer to the following figure for location of DIP switch and chassis jumper.

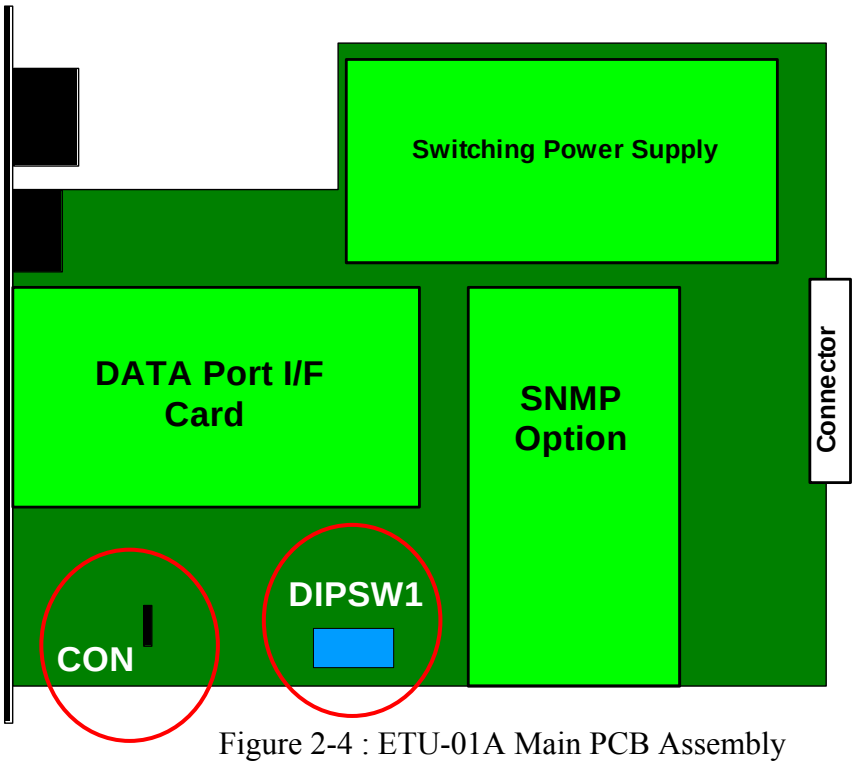


Figure 2-4 : ETU-01A Main PCB Assembly

Chapter 3. LCD Operation

3.1 General

This chapter describes the ETU-01A controls and indicators, and explains operation setup procedures. Installation procedures (in Chapter 2) must be completed and checked before attempting to operate the ETU-01A.

3.2 Controls and Indicators

All controls (push-button switches), LCD display and LED indicators are located on the ETU-01A front panel. The momentary on pushbutton switches are used to activate menu selections and select parameter settings.

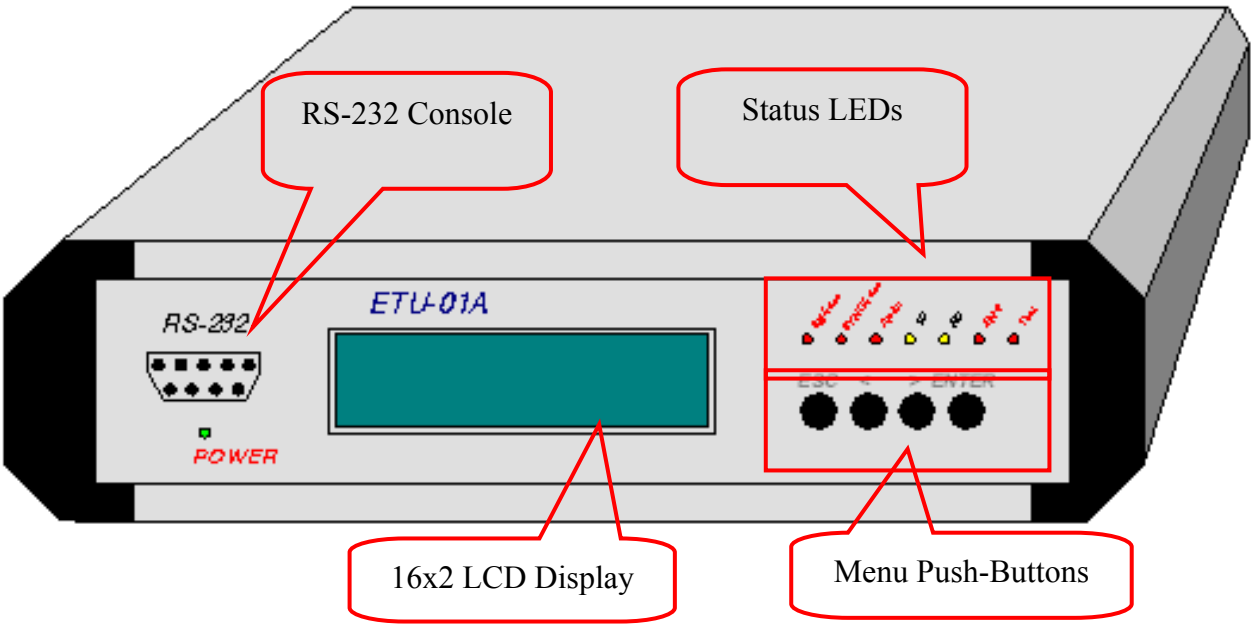


Figure 3-1 : ETU-01A Front Panel

3.3 Operating Procedure

3.3.1 LCD and Menu Keys

The ETU-01A requires no operator attention once installed, except for occasional monitoring of the front panel indicators. Intervention is only required when:

The ETU-01A has to be adapted to new operational requirements.

Diagnostic loops are required.

The ETU-01A is turned on when its AC power cord is connected to an AC power outlet and the power switch is turned to the ON position. The ETU-01A will perform its internal POST (power on self test) to verify CPU, RAM, ROM and FPGA integrity. The initial display looks like this:

```
ETU-01A / SNMP
SELF TEST
```

After about 2 seconds, the tests will be completed and display:

Use the '<' and '>' arrow keys to browse the menus and select parameters. Use the 'ESC' function key to return to a previous menu or to abandon setup. Use the 'ENTER' function key to set a parameter of a selection or to enter a sub-menu.

3.3.2 LED Status Indicators

The POWER indicator will be lit, indicating that the ETU-01A is on. If the LCD display back light is set to either AUTO or ON, it will be lit. Verify the ETU-01A is in operation by checking that the front panel LEDs match the following indicator conditions:

POWER:	ON
Sig Loss:	OFF
SYNC Loss:	OFF
Alarm:	OFF
TD:	ON, OFF or flashing
RD:	ON, OFF or flashing
Error:	OFF
Test:	OFF

3.4 Menu Operation

3.4.1 Top Level Menus

The following are the eleven MAIN MENUs (top level). Press an arrow key to select another Main Menu or press ENTER to reach a sub menu.

Set the Master timing and remote mapping configuration.

Set the Frame type, CRC mode, idle code, Line code and RAI for the E1 link.

Assign the E1 timeslots to be used by the Data Channel.

Data Port Informational screen and settings for Clock Mode, Handshaking, and multiplier (n56K or n64K).

Enable E1 link or data channel Loop Back.

Enable BERT, select E1 or data channel, select pattern, do error insertion and display error results.

Setup for the terminal console port speed. Default is 9600, 8bit, no parity.

Display and set the internal real time clock of the ETU-01A.

Set the LCD password and mode of the LCD backlight either Off, On, or Auto.

Display the Alarm Buffer and remote alarm buffer.

Displays the CRC-4, BPV (bi-polar violation), E-bit, and FAS error counts.

3.4.2 System Parameter Detail

The following shows the three setup screens under the System Parameter Main Screen; Master Timing, Send Mapping, and Remote Mapping.

SYSTEM PARAMETER.

Press ENTER, MASTER TIMING sub-menu will be displayed. Master Timing sets the source for the timing in the ETU-01A. The default is Recovery timing (from E1 received signal).

Pressing ENTER again will place the cursors on the parameter selection line. The arrow keys are now used to browse the available parameters. Available parameters under Master Timing are:

RECOVERY; Timing is recovered from the main E1 link.

INT OSC; Timing is provided by the internal oscillator of the ETU-01A.

DTE 1; Data channel accepts user transmit clock and provides receive clock to DCE on data port. (transparent timing)

DTE 2; Data channel accepts user transmit clock (from ETC pin) and receive clock (from ERC pin) provided by DCE on data port.

DTE 3; Data channel accepts user transmit clock and receive clocks (both from ETC pin) provided by DCE on data port.

Press the ENTER key on the selected parameter. The cursors will return to the top line. Press ESC to return to the top menu level, use the right arrow key to reach the "E1 LINE" menu.

From the MASTER TIMING sub-menu press ESC to return to the **SYSTEM PARAMETER** screen. Press the Right Arrow key to the SEND MAPPING screen.

If the remote unit has its "Remote Mapping Control" turned on, this unit may send the timeslot mapping information to the remote. This feature enables bandwidth adjustments (active timeslot information) to be passed to the remote unit. To send mapping, press ENTER twice.

To enable the remote mapping function on this unit, from the SEND MAPPING sub-menu press the Right Arrow key to the **REMOTE MAPPING** screen.

When ON, this unit will allow "Remote Mapping Control" from the remote connected unit. If OFF, the remote unit may not modify this unit's timeslot mapping. To modify the parameter, press ENTER once, then use the arrow keys to toggle "ON" or "OFF". Press ENTER to effect the change. Typical settings would place the CO side unit to controlled "OFF", while the CPE side device would be controlled "ON".

Note: This is a proprietary function which uses the reserved SA bits of FAS header to perform an in-band management. This function will not work if E1 framing is set to Unframed. It will also only work when connected to another ETU-01A or to ERM01 E1 concentrator.

From the REMOTE CONFIG sub-menu press ESC to return to the **SYSTEM PARAMETER** screen. Press the Right Arrow key to the MODIFY PASSWORD screen.

Press ENTER;

Use the arrow keys to change each value, 0~9 and then press ENTER to edit the next value. Any password can be entered from 0000~9999. It must be entered twice to check that password was properly keyed. Use the value 0000 to clear any previous password, i.e. 0000 equals no password. Contact your distributor or agent if you set and forget the password and need to recover the unit.

3.4.3 E1 Line Parameter Detail

The following screens show the setup screens under the E1 Line Parameter Screen.

Press ENTER and the E1 LINE sub-menu will be displayed. E1 Line sets the frame type, CRC mode, cascade mode, idle code, RAI state and Line Code for the E1 link of the ETU-01A.

Use the arrow keys to browse the individual link parameters (frame, CRC, etc.). Press ENTER on the parameter to select it with the cursors. Now use the arrow keys to browse the available settings for that parameter. The following is a breakdown of each parameter and available settings:

FRAME; CCS(PCM31), CAS(PCM30), or UNFRAME, CCS default.

Note: When UNFRAME is selected, the Data Port rate is automatically set to 2.048 Mbps.

CRC-4; OFF or ON, OFF default. (no use when unframed)

CASCADE, OFF or ON. OFF default.

IDLE CODE; any hex code from 00 to FF, 7E default.

RAI; (Remote Alarm Indicator) DISABLE or ENABLE, ENABLE default.

LINE CODE; HDB3 or AMI, HDB3 default.

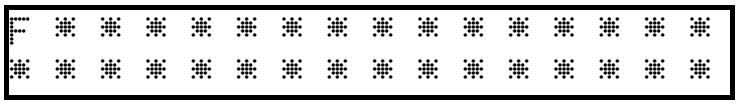
IMPEDANCE; displays setting dependant upon the DIPSW1 settings.

3.4.4 Timeslot Mapping Detail

The following screen is an example of the screen under Timeslot Mapping.

TIME SLOT MAPPING

Press ENTER.



The E1 frame is shown with 32 timeslots, top row left to right are TS0-15, while the bottom row displays the settings for TS16-31. Press ENTER to assign the TS, use the arrow keys to move to the next or previous TS. Designations shown are described as follows:

F = Framing (CCS/CAS) always on TS 00

S = Signaling (CAS) always on TS 16 if in CAS frame mode

. = not assigned

* = Data Channel uses this TS

Note:

TS 00: Cannot be assigned in CCS or CAS mode of E1 LINE to anything but Framing.

If TS 16 is assigned, the frame mode will not be able to be changed to CAS framing until the TS is freed (not assigned).

TS 16: Will automatically be assigned to Signaling in CAS mode of E1 LINE and can only be used for Signaling. Signaling is usually required when E1 is being used to transmit voice channels.

3.4.5 Data Port Parameter Detail

The following shows the setup screens under the Data Port Parameter Screen.

DATA PORT PARAMETER

Press ENTER

The first line shows the data port interface type, clock mode, and the channel's multiplier value (56K or 64K). The second line shows the channel's bandwidth used. In the above display, the data port is using an RS530 interface, clock mode set to E1 Recovery, 64k multiplier and 256Kbps bandwidth (4x64K timeslots). The interface type is automatically displayed from the identity of the installed module.

Note:

The exceptions to the interface type displayed are with NRZ/BNC or for RS-449 installed. The display will show that an X21 module is installed instead of NRZ and RS-449 uses an adapter cable on an RS-530 module, so it will display as RS530.

Pressing ENTER from the **Data Port** display will enable editing of the Data Port parameters.

While at the Data Port display, only the multiplier value (N64 or N56) and handshaking (CTS) modes are user settable. As previously stated, the interface type is auto-detected and the data bandwidth is calculated by multiplying the multiplier value times the number of timeslots assigned to the channel under the Timeslot Mapping screen.

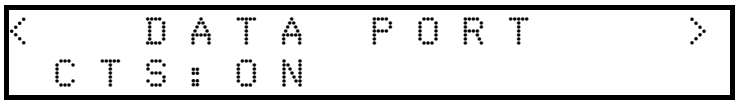
Use the arrow keys to browse the available settings under the Data Port channel. They are:

Multiplier value; N64 or N56, default is N64

CTS; ON or (follow) RTS, default is ON

Press the ENTER key to move the cursors to the Multiplier field. Select either N64 or N56 using the arrow keys, then press ENTER. The default is N64.

Use the arrow key to move on to the next parameter setting for CTS.



Press ENTER to move the cursors to the CTS field. Select either ON or RTS using the arrow keys, then press ENTER to effect the change. The default setting is ON.

Note:

CTS ON means the CTS signal will always be pulled high. When set to RTS, it means the CTS signal will "follow" RTS.

If the Data Port channel module is not installed, a readout similar to the following will be displayed.

3.4.6 Loop back Parameter Detail

The following shows the setup screens under the Loop back Parameter Screen.

LOOPBACK PARAMETER.

Press ENTER

Use the arrow keys to select between the E1 LINE or DATA PORT loop back settings. The DATA PORT display is as follows:

Use the arrow keys to browse the available options for both the E1 Line Loop back and the Data Port Loop back settings. The details for both are as follows:

E1 Line; Loop back Off, Local Analog, Local Digital, Local Payload, Remote Analog or Remote Payload. Default is Loop back Off.

Data Port; Loop back Off, Local Analog, Local Digital, or V.54 Loop. Default is Loop back Off.

Press ESC twice to back out to LOOP BACK PARAMETER and use the right arrow key to move on to the BERT TEST menu.

3.4.7 BERT Test Detail

The following displays show the setup screens under the BERT test Parameter Screen.
BERT TEST PARAMETER

Press ENTER

Use the arrow keys to browse the available options for BERT test setting.

The details are as follows:

Function; Off or On, default Off. Use to start BERT.
Channel; E1 or Data. Default is E1.
Pattern; 511, 2047, 2e15-1, 2e20-1, QRSS, 2e23-1, All 1, All 0, Alt, 0011, 3in24, 1in16, 1in8, or 1in4. Default is 511.
Err Ins; NONE, Single,10e-1, 10e-2, 10e-3, 10e-4, 10e-5, 10e-6, or 10e-7. Default is NONE.
Result; display the received error bit count and error rate.

BERT TEST ERROR INSERT (SINGLE)

When selecting the Single Error insert the following screen will display.

Press ENTER each time you want to insert an error.

3.4.8 Control Port Parameter Detail

The following shows the setup screens under the Control Port Parameter Screen.

CONTROL PORT PARAMETER

Press ENTER

This screen shows the default settings for the Control Port.

Only the speed parameter is settable for the Control Port. Press ENTER.

The arrow keys will browse the available parameters for speed setting. They are as follows:

Speed; 300, 600, 1200, 2400, 4800, 9600, and 19200, default is 9600.
Data Length; fixed at 8 only.
Parity; fixed at NONE only.

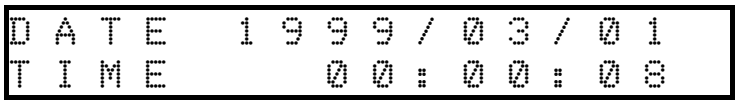
Follow the normal screen procedures to set the speed parameter, then press ESC to return to the upper menu.

3.4.9 Date & Time Display & Set Detail

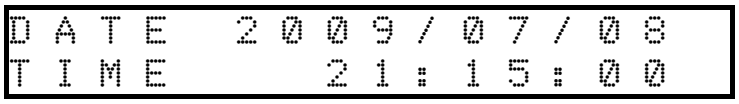
The ETU-01A has a built-in realtime clock (RTC) that does time keeping even when the unit has been powered off. The following shows the setup screens under the Date & Time Parameter Screen.

DATE & TIME DISPLAY & SET

Press ENTER to display current Date and Time.



Press ENTER again to define date and time. The cursor will be in the year field. Use the arrow keys to increment or decrement the year. Press ENTER to save and move on to the month field. Use the arrow keys again to change the month, press ENTER to save and move to the Day field. Continue this procedure for the time settings and then press ESC to start the clock from the set time. The clock used in the ETU-01A is a Dallas DS1743 and is fully Y2K compliant.



Press ESC again to exit to the upper menu.

3.4.10 Miscellaneous Setup Detail

The following shows the setup screens under the Miscellaneous Parameter Screen.

Miscellaneous Parameter Display

Press ENTER.

Use the arrow keys to browse the two menu screens under Miscellaneous. They are LCD LIGHT and RESET TO DEFAULT. While displaying the LCD LIGHT screen, press ENTER.

Use the arrow keys to browse the available options for the LCD back lighting. They are:

AUTO; The backlight will automatically turn off in 5 minutes if no key is pressed. The backlight will automatically turn on again if any key is pressed. Default is AUTO.

ON; The backlight will remain permanently on.

OFF; The backlight will remain permanently off.

Select the appropriate value and press ENTER.

Use the arrow keys to browse to the RESET menu.

Press ENTER.

Press the ENTER key to completely reset all parameters to their original factory defaults.

3.4.11 Alarm Buffer Display Detail

Use this function to display the local or remote Alarm Buffer and/or clear the local Alarm Buffer.

Press ENTER and use the arrow keys to select between DISPLAY ALARM BUFFER, DISPLAY REMOTE ALARM BUFFER, and CLEAR ALARM BUFFER. On the display screen, press ENTER.

Refer to Table 5-2 in Chapter 5 TEST and DIAGNOSTICS, for the meaning of the displayed alarms.
Use the right arrow key to browse to the REMOTE ALARM screen.

Pressing ENTER will read the alarm buffer from the remote unit.

If you use the arrow keys to browse to the CLEAR function, the following will be displayed.

Press ENTER to clear the alarm buffer or press ESC to exit.

3.4.12 Performance Display Detail

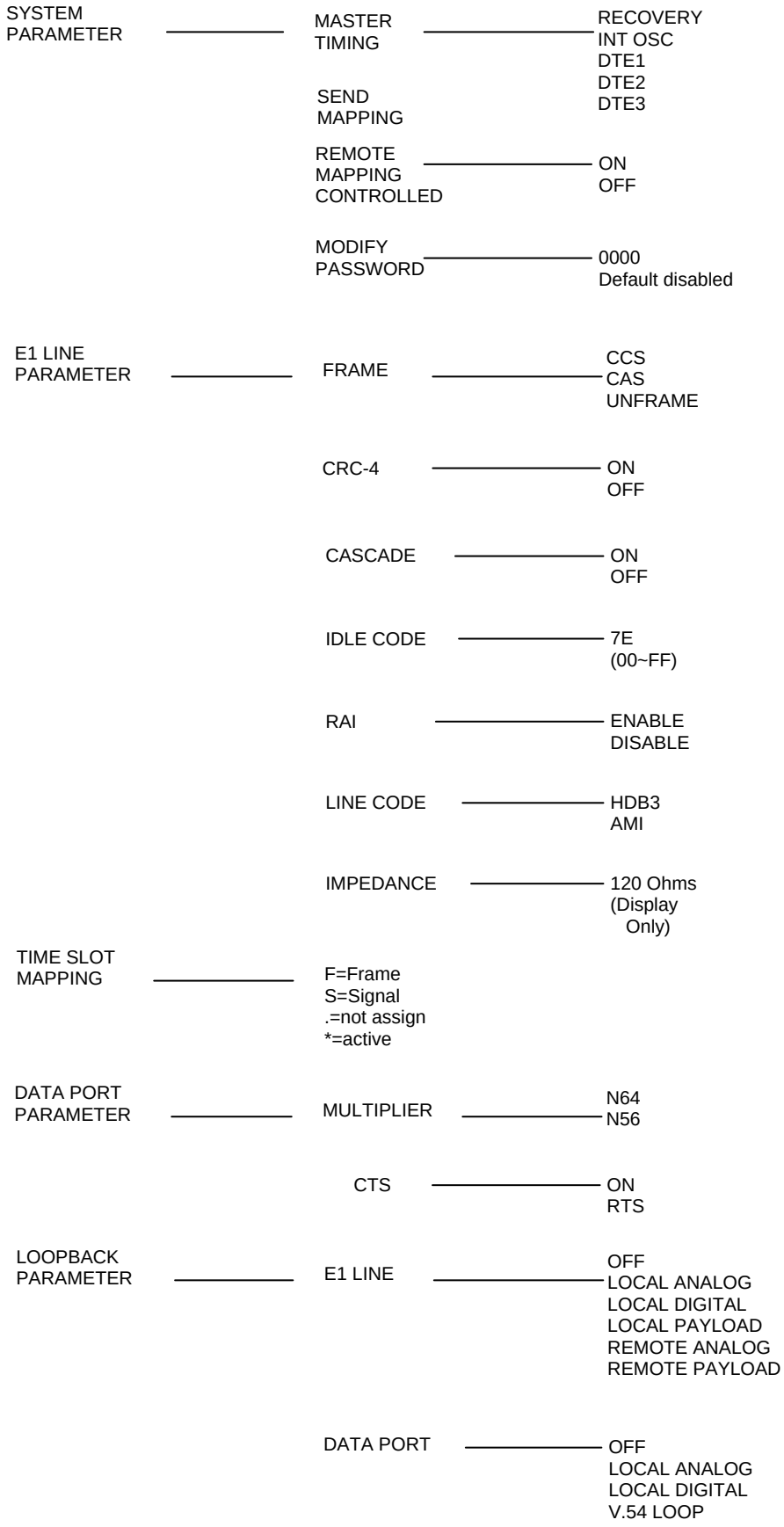
Press the right arrow key to display the last top level menu.
PERFORMANCE DISPLAY

The Performance Display is used to show the CRC-4 (checksum) count (CRC4 Cnt) or Bipolar Violations (BPV) count, Current Error Seconds (CURR ES), Current Unavailable Seconds (CURR UAS), Long Term Errored Seconds (LONG ES), Long Term Unavailable Seconds (LONG UAS), Current Seconds (CURR SEC) and Long Seconds (LONG SEC). Refer to Appendix B, for the detailed meaning of the performance displays. Press ENTER.

Press the arrow keys to browse the error counts for CRC4 Cnt, CURR ES, CURR UAS, etc. To exit the performance display, press ESC. To clear the data registers, press ENTER on the Reset page.

This completes the detailed discussion of the function setup and operation of the ETU-01A via the front panel LCD display.

ETU-01A Menu System Overview



ETU-01A Menu System Overview (cont.)

- BERT TEST PARAMETER
  - FUNCTION
    - ON
    - OFF
  - CHANNEL
    - E1
    - DATA
  - PATTERN
    - 511
    - 2047
    - 2e15-1
    - 2e20-1
    - QRSS
    - 2e23-1
    - ALL 1
    - ALL 0
    - ALT
    - 0011
    - 3in24
    - 1in16
    - 1in8
    - 1in4
  - ERR INS
    - NONE
    - SINGLE [ENTER]
    - 10e-1
    - 10e-2
    - 10e-3
    - 10e-4
    - 10e-5
    - 10e-6
    - 10e-7
  - RESULT
    - (Display)
- CONTROL PORT PARAMETER
  - SPEED
    - 9600 (default)
    - 300
    - 600
    - 1200
    - 2400
    - 4800
    - 19200
- DATE & TIME DISPLAY & SET
  - DATE
    - (set date/time)
  - TIME
- MISCELLANEOUS SETUP
  - LCD LIGHT
    - AUTO
    - ON
    - OFF
  - RESET TO DEFAULT
    - [ENTER]

ETU-01A Menu System Overview (cont.)

ALARM BUFFER DISPLAY

- DISPLAY ALARM BUFFER
- DISPLAY REMOTE ALARM BUFFER
- CLEAR ALARM BUFFER

PERFORMANCE DISPLAY

- BPV CNT
- ERR SECS
- UAS
- LONG ES
- LONG UAS
- CURR SEC
- LONG SEC

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Chapter 4. Control Port Operation

4.1 General

The ETU-01A Control Port, sometimes referred to as a Console port, (labeled RS-232 on the front panel) is a serial console terminal port designed to facilitate setup of all parameters through the use of a standard text based (ANSI) terminal or any terminal emulation program running on a Personal Computer. The operation uses a serials of menus and requires no special CLI commands.

4.2 Terminal Connection

A laptop computer has become an invaluable tool of the Systems Engineer. A convenient application, provided with the Microsoft Windows® NT/9X/2K/Xp operating systems, is "HyperTerminal ™". Connection of the ETU-01A to the computer is accomplished by a DB9-pin one-to-one, male to female cable. The ETU-01A acts as a DCE to the PC's DTE communications port. Set the properties to match the ETU-01A control port defaults as follows: Baud=9600, Data bits=8, Parity=None, Stop bits=1, and handshaking =None and use a direct connection to the PC's COM port. Set the terminal emulation mode to ANSI. Make the appropriate connections, start the terminal application, apply power to the ETU-01A, then press ENTER or SPACE on the PC keyboard. If you are using "HyperTerminal ™" the display should look like that below.

```
          ******************************************
          ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
          ****    ETU-01A/SNMP  TERMINAL MODE     ****
          ****       SETUP MENU  VER  2.22        ****
          ******************************************

    1.  Display System Status.
    2.  Define System Parameter.
    3.  Test Function Parameter.
    4.  Password
    5.  Reset Data to Default.
    6.  EXIT

    DATE : 2008/10/14       TIME : 12:38:53


    Enter 1-6 to select function.
```

Windows® is a registered trademark of Microsoft Corp., Redmond, WA.
HyperTerminal is a trademark of Hilgraeve, Monroe, MI

Note:

The latest Windows operating system, Vista, no longer includes the HyperTerminal program. You can find a personal edition which will work in Vista, from Hilgraeve's website. Alternately, there are other terminal emulation programs which are both free and which work on all versions of Windows. Search the Internet for PuTTY and TeraTerm Pro. PuTTY is also an excellent SSH client.

4.3 Menu System Detail

The menu systems are displayed in the same order and with the same parameters as those in the LCD display. The following section will detail actual displays with descriptions of parameter settings via relevant key commands.

This is the first screen seen after connecting. Note that the first two items, "Display" and "Define" deal with all the unit's configuration settings. The Display item will browse settings for viewing only, while under Define, all parameters may be both viewed and changed.

```
          ******************************************
          ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
          ****    ETU-01A/SNMP  TERMINAL MODE     ****
          ****       SETUP MENU  VER  2.22        ****
          ******************************************

    1.  Display System Status.
    2.  Define System Parameter.
    3.  Test Function Parameter.
    4.  Password
    5.  Reset Data to Default.
    6.  EXIT

    DATE : 2008/10/14       TIME : 12:38:53


    Enter 1-6 to select function.
```

Enter the number keys 1-6 to select function.

Since this document's concern is with configuring the device, we will skip item #1, the **Display System Status** and go right into configuration with item # 2, **Define System Parameter**. You may review the use of item #1 on your own, which will be clear after using item #2.

Enter 2 to enter the Define System Parameter menu.

```
          <<  Define System Parameter  >>


    1.  Timing
    2.  E1 Line
    3.  Remote E1 Line
    4.  Time Slot
    5.  Data Port
    6.  Remote Data Port
    7.  Date & Time
    8.  Remote Config Function.
    9.  SNMP Agent Setup
    A.  Threshold



    Enter 1-A or Press "ESC" to previous menu.
```

The first selection of system parameters is the Timing parameter, so **let's enter 1**.

```
        <<  Define Master Timing Parameter  >>

     Master Timing : RECOVERY

     1.  Recovery
     2.  Internal OSC
     3.  DTE 1
     4.  DTE 2
     5.  DTE 3

     Enter 1-5 or Press "ESC" to previous menu.
```

The current master timing is shown as "Recovery". This means that the timing source is derived from the received E1 signal. Press the appropriate number key to change the timing. The change will be immediately reflected. Enter ESC to return to the Define System Parameter menu.

Next, press 2 to define the parameters for the E1 Line.

```
        <<  Define E1 Line Parameter  >>

     1.  FRAME
     2.  CRC-4
     3.  CASCADE
     4.  IDLE CODE
     5.  RAI
     6.  LINE CODE

     Enter 1-6 or Press "ESC" to previous menu.
```

All of the E1 parameters are set through this one menu, except for the timeslot assignment. Here you can setup the framing type, CRC-4 enabled or not, enable cascade function, modify the default idle code, enable or disable the Remote Alarm Indication, and select AMI or HDB3 line coding.

To define the Frame type for the main E1 link, press 1.

```
<<  Define E1 Line Frame Parameter  >>

Frame       : CCS

1.  CCS
2.  CAS
3.  UNFRAME

Enter 1-3 or Press "ESC" to previous menu.
```

The current frame type setting is CCS. To change it enter 1~3. Press ESC to exit and leave the setting unchanged. Press ESC. Press 2 to change the CRC-4 setting.

```
<<  Define E1 Line CRC-4 Parameter  >>

CRC-4       : OFF

1.  OFF
2.  ON

Enter 1-2 or Press "ESC" to previous menu.
```

The current setting for CRC-4 is Off. To turn on, press 2. To exit without changing, press ESC. Press 3 to define the Cascade Mode.

```
<<  Define E1 Line Cascade Mode  >>

Cascade     : OFF

1.  OFF
2.  ON

Enter 1-2 or Press "ESC" to previous menu.
```

In Cascade mode, the unused timeslots are not filled with idle code. Instead, they pass through their received data transparently. This allows for 'Drop&Insert' or Cascading of multiple ETU-01A units to build up a type of multiplexer where the entire E1 bandwidth can be divided between different logical units. This is a simple way to split E1 bandwidth over 2 data communication interfaces. However, we recommend using our ETU02-MUX with multiple (4) data port module slots for multiplexing applications.

Press ESC and enter 4 to define the Idle code for the E1 line.

```
<<  Define E1 Line Idle Code  >>

Idle Code  : 7E

Enter Code (00~FF) :
```

Enter the new Idle code with the hex value 00~FF, or to exit, press ESC. Press ESC and enter 5 to enable or disable RAI (Remote Alarm Indication) for the E1 line.

```
<<  Define E1 Line RAI Parameter  >>

RAI        : DISABLE

1.  Disable
2.  Enable

Enter 1-2 or Press "ESC" to previous menu.
```

Press 1 to disable, 2 to enable RAI, or press ESC to exit without changing the RAI setting.

Press ESC and enter 6 to define the E1 Line code.

```
<<  Define E1 Line Code  >>

Line Code : HDB3
1.  HDB3
2.  AMI

Enter 1-2 or Press "ESC" to previous menu.
```

Press 1 to define a Line Code of HDB3, press 2 to define a Line Code of AMI or press ESC. This completes the setting for E1 Line Parameter menu.

Press ESC again to return to the top of the Define System menu.

```
        <<  Define System Parameter  >>


1.  Timing
2.  E1 Line
3.  Remote E1 Line
4.  Time Slot
5.  Data Port
6.  Remote Data Port
7.  Date & Time
8.  Remote Config Function.
9.  SNMP Agent Setup
A.  Threshold



Enter 1-A or Press "ESC" to previous menu.
```

To enter the Timeslot Mapping menu, press 4.

```
<<  Define Time Slot Mapping  >>


1.  Define Time Slot Mapping.
2.  Send Time Slot to Far End.
3.  Define Remote Time Slot Mapping


Enter 1-3 or Press "ESC" to previous menu.
```

Item 1 supports the immediate and local setting of timeslots in this unit. Item 2&3 are both used to configure a remote ETU-01A, if it is already linked with the local unit by E1. The E1 must be framed, FAS or CAS, in order to support the remote in-band setting. Item 2 sends the entire timeslot mapping to the remote unit. Item 3 allows individual setting through in-band management.

To define the Timeslot mapping assignments, press 1.

```
<<  Define Time Slot Mapping  >>

TIME SLOT 01
TYPE : Data port

1.  NC
2.  Data Port


Enter 1-2 or Press "ENTER" to next Time Slot or "ESC" to previous
menu.
```

Edit the timeslots, one-by-one and either assign it to the data port, or make it not connected. Each timeslot will provide 64Kbps data bandwidth.

To view the entire timeslot mapping, use ESC to exit all the way back to the main menu and select item 1, **Display System Status**, select item 3 **Time Slot**.

```
<<  Display Time Slot Mapping  >>

SLOT : 00       01      02      03      04      05      06      07
TYPE : Fr        *       *       *       *       *       *       *


SLOT : 08       09      10      11      12      13      14      15
TYPE :  *        *       *       *       *       *       *       *


SLOT : 16       17      18      19      20      21      22      23
TYPE :  *        *       *       *       *       *       *       *


SLOT : 24       25      26      27      28      29      30      31
TYPE :  *        *       *       *       *       *       *       *



* : Time slot used          . : Time slot not used
Fr: Framing                Si: Signaling

Press "ESC" to previous menu.
```

In the above example, TS01-TS31 are all used. This is obviously an FAS or PCM31 framing (note TS00 is assigned to Framing). The bandwidth supplied by these 31 time slots is 1984kbps (31x64kbps).

Return to Time Slot setting, from Main menu select item 2, **Define System Parameter** followed by item 4, **Time Slot**. Continue to set the timeslot mapping assignments, go on to the next timeslot or ESC. ESC will take us back to the Define Time Slot Mapping menu.

Selecting item 2 will attempt to take the defined time slot mapping for the local unit and send it to the remote ETU-01A unit. In this way, the bandwidth can be controlled from the local unit. The E1 must be in SYNC, the framing matched (cannot be unframed) and the remote unit must already be configured to accept remote assignment.

```
<<  Define Time Slot Mapping  >>


1.  Define Time Slot Mapping.
2.  Send Time Slot to Far End.
3.  Define Remot Time Slot Mapping


Enter 1-3 or Press "ESC" to previous menu.
WAIT .........
```

WAIT.....OK

The message "WAIT…" will be displayed while the data is being transferred. "OK" will display following successful transfer. Pressing ESC will take us back to the **Define System Parameter** menu.

```
<<  Define System Parameter  >>


1.  Timing
2.  E1 Line
3.  Remote E1 Line
4.  Time Slot
5.  Data Port
6.  Remote Data Port
7.  Date & Time
8.  Remote Config Function.
9.  SNMP Agent Setup
A.  Threshold



Enter 1-A or Press "ESC" to previous menu.
```

To enter the **Data Port** setting menu, press 5.

```
<<  Define Data Port Parameter  >>

TYPE       :  RS530
MULTIPLIER : N64
CTS        : ON
V.54 Mode  : OFF
SPEED      : 1984Kbps


1.  Multiplier
2.  CTS


Enter 1-2 or Press "ESC" to previous menu.
```

Press the appropriate number 1~2 corresponding to the Data Port parameter to be defined.

Press 1 to define the multiplier for the data port and select either N64 or N56. The default and most commonly used multiplier is N64.

Press 2 to define the CTS parameter, either always ON or follow RTS.

Press ESC and return to the **Define System Parameter** menu and press 7 to set **Date & Time**. The following is an example of setting the system date and time.

```
<<  Define Date & Time  >>

1.  DATE
2.  TIME

DATE : 2008/10/14       TIME : 18:48:45

Enter 1-2 or Press "ESC" to previous menu.
```

Press 1 to set the Data, press 2 to set the Time. Here is an example of setting the date, press 1.

```
<<  Define Date  >>

YEAR (1900 ~ 2099) : 2008
MONTH ( 01 ~ 12 )  : 10
DAY   ( 01 ~ 31 )  : 14
```

Note:
The RTC (realtime clock) chip is fully Y2K compliant.

The time is set in an identical manner as with the Date. Press 2 from the **Define Date & Time** menu.

```
<<  Define Time  >>

HOUR (00 ~ 23) : 18
MINUTE (00 ~ 59) : 56
SECOND (00 ~ 59) : 59
```

Return to the Define System Parameter menu and select item 8, **Remote Config Function**.

```
<<  Remote Config Function  >>

Controlled : ERM

1.  ERM
2.  ETU
3.  OFF

Enter 1-3 or Press "ESC" to previous menu.
```

This is where we configure the type of unit that will remote control this ETU-01A unit. We can select control from another ETU-01A, from the ERM01 E1 concentrator rack, or we can turn OFF remote control so this device won't support in-band management.

Return to the Define System Parameter menu and select item 9, **SNMP Agent Setup**.

```
<<  SNMP Agent Setup Menu  >>


1.  SNMP Agent Config.
2.  Manager Config.
3.  TFTP and Flash.
4.  Save and Restart.

Enter 1-4 or Press "ESC" to previous menu.
```

Note:
If you get the message that SNMP is not found it could mean one of two things:
1. The SNMP hardware option is not installed in the ETU-01A
2. The SNMP agent requires about 20-30 seconds to boot, until then it may not be recognized.

SNMP Agent Setup background

The SNMP agent is a 32 bit embedded processor system that runs a kernel, network layer and SNMP process that is linked to the ETU-01A hardware. When used with proprietary MIB 2 file, a network management software will be able to configure all settings, read performance and alarm information, and receive meanings of unsolicited trap (alarm) messages from the ETU-01A.

The settings of the Agent require IP address, subnet mask and default gateway. Additionally, any manager must have its IP address also configured in the Agent along with community string settings for Read/Write and Read Only.

The Agent also supports software upgrade by configuring a TFTP server's IP address and giving the filename of the upgrade image. The image is transferred by TFTP, checksum confirmed, flash erased and then written with the new image.

The **SNMP Agent Setup Menu** contains all the items to configure the above.

Select item 1, **SNMP Agent Config**.

```
<<  SNMP Agent Config  >>


1  SNMP Agent IP:  [172. 24.  1. 21]
2  Subnet Mask  :  [255.255.255.  0]
3  Gateway IP   :  [172. 24.  1.254]
4  Device Name  :  [ETU-01A]

5  TFTP Server IP  :  [172. 24.  1.125]
6  TFTP Server Path:  [ETU-01Av202.BIN]


Enter 1-6 or Press "ESC" to previous menu.
```

The menu items are pretty self-explanatory. First setup the TCP/IP settings for IP, mask and gateway. The **Device Name** is the "sysName" which will be reported via the SNMP standard MIB2. The **TFTP server IP** is the IP address of the server used to hold the upgrade image and from which the ETU-01A SNMP will download the upgrade image during an upgrade process. The **TFTP Server Path** contains the filename (case sensitive) of the upgrade image.

Select item 2, **Manager Config**.

```
<<  Manager Config  >>


1  Community #1 (R/W) :  [secret]
2  Community #2 (Read):  [public]

3  Access IP #1 :  [172. 24.  1.125]  [Community #1]  [Trap]
4  Access IP #2 :  [172. 24.  1.251]  [Community #1]  [Trap]
5  Access IP #3 :  [192.168.  0. 49]  [Community #1]
6  Access IP #4 :  [  0.  0.  0.  0]  [Community #1]  [Trap]
7  Access IP #5 :  [  0.  0.  0.  0]  [Community #1]  [Trap]
8  Access Ip #6 :  [  0.  0.  0.  0]  [Community #1]  [Trap]
9  Access Ip #7 :  [  0.  0.  0.  0]  [Community #1]  [Trap]
A  Access Ip #8 :  [  0.  0.  0.  0]  [Community #1]  [Trap]


Enter 1-A or Press "ESC" to previous menu.
```

Use items 1&2 to set the SNMP community string variables. One variable is for Read/Write access (can do SNMP set as well as get), while the other variable is the Read Only string (SNMP manager can only perform get operations). The SNMP Agent holds space for up to 8 manager IP addresses (select 3~A). Each manager can be configured to receive traps or not and each manager is given authority by assigning it either the R/W or Read community string.

IMPORTANT:

After doing any configuration of the SNMP agent, the settings must be saved and the agent rebooted. Select item 4, **Save & Restart**, from the **SNMP Agent Setup Menu**.

Upgrade:

When we release new upgrade firmware, it is always packaged in a ZIP file and available for download from our website. The ZIP file will include the following files:

1. The upgrade image file with "bin" file extension.
2. A free Windows TFTP server application that requires no installation.
3. A PDF file with detailed procedure to upgrade the SNMP agent.

Since upgrade packages already include the detailed upgrade procedure, the procedure will not be covered in this manual.

Press ESC until reaching the **Define System Parameter** menu. Select item 'A' to configure the performance **Threshold** settings.

```
<<  Define Threshold Function  >>


1.  ES Threshold             899
2.  UAS Threshold            899
3.  Remote ES Threshold
4.  Remote UAS Threshold

Enter 1-4 or Press "ESC" to previous menu.
```

The threshold settings can be configured or local and remote ES (Errorred Seconds) and UAS (UnAvailable Seconds) to a threshold value of 1 to 900 seconds. 900 seconds is 15 minutes, or exactly one "interval" of performance data. The ETU-01A is able to provide performance data in 15 minute intervals for up to 24 hours (96 intervals total). Performance data can be stored for long term analysis by having EMS (Element Management System) software poll all network devices, gather performance data, and store in database for future retrieval.

Here is an example of entering threshold setting for UAS.

```
<<  Define UAS Threshold  >>

Enter (001-900) Seconds :
```

Use ESC repeatedly until the top setup menu is reached. Select item "3" **Test Function Parameter** to bring up the menu set for loop back and BERT testing.

```
<<  Define Test Mode Function  >>


1.  LoopBack Test
2.  Bert Test


Enter 1-2 or Press "ESC" to previous menu.
```

There are two items under the **Define Test Mode Function** menu. The loop back test option sets up the various loop back locations available on the ETU-01A. The BERT test uses the internal pattern generator and pattern reader to compare data patterns and return error rate results.

Select **LoopBack** test item from the **Define Test Mode Function** menu.

```
<<  Define LoopBack Test Port  >>

E1 Line LoopBack :  LOOPBACK OFF
Data Port LoopBack :  LOOPBACK OFF


1.  E1 Line
2.  Data Port


Enter 1-2 or Press "ESC" to previous menu.
```

Select item 1, **E1 Line**.

```
<<  E1 Line LoopBack  >>

E1 Line LoopBack :  LOOPBACK OFF

1.  OFF
2.  Local Analog
3.  Local Digital
4.  Local Payload
5.  Remote Analog
6.  Remote Payload


Enter 1-6 or Press "ESC" to previous menu.
```

Five different loop back modes are available for E1. Please refer to Chapter 5, Loop Back & BERT Testing for details on how to implement each of the different loop back types.

```
<<  Data Port LoopBack  >>

Data Port LoopBack :  LOOPBACK OFF

1.  OFF
2.  Local Analog
3.  Local Digital
4.  V.54 Loopback


Enter 1-4 or Press "ESC" to previous menu.
```

Three different loop back modes are available for the Data Port. Please refer to Chapter 5, Loop Back & BERT Testing for details on how to implement each of the different loop back types. The various loop back modes may be used along with the integral BERT pattern generator/tester or with external pattern generator test equipment such as our BTM-10 E1/T1 Transmission Analyzer.

ESC back to the **Define Test Mode Function** menu and select item 2, **Bert Test**.

```
<<  Bert Test Parameter  >>

Function : OFF          Channel  : E1
Pattern : 2e15-1        Error Insert : NONE

1.  Function
2.  Channel
3.  Pattern
4.  Error Insert
5.  Result


Enter 1-5 or Press "ESC" to previous menu.
```

The ETU-01A's internal pattern generator supports a wide range of telecommunications standard test patterns. Select the pattern under the menu item "3" **Pattern**. Select the "channel", E1 or Data Port, to send the test pattern and receive pattern for comparison using item "2" **Channel**. Lastly enable the pattern testing by turning "on" the **Function** under item "1".

The following is an example of a **Result** screen, testing the E1 channel with a physical loop back on the E1. Alternately, the loop back could be employed through the internal mechanism via the user interface. Both methods are employed when doing field troubleshooting.

```
<<  Display Bert Test Result  >>

Rx Bit : 816103994

Rx Error Bit : 0

Rx Error Rate : 0.0e-00

Press "ESC" to previous menu or "SPACE" to review , "ENTER" to
clear.
```

After reviewing test results the testing may be stopped by selecting the **Function** again and setting the test to "Off". Remove any previously applied loop back or reconnect interface cables to bring the unit back into service.

More details on loop back and trouble shooting are explained in Chapter 5. Loop Back & BERT Testing.

Use the ESC key to return to the top Setup menu. Select item "4" **Password**.

```
<<  Password  >>

1.  Set Password
2.  Clear Password


Enter 1-2 or Press "ESC" to previous menu.
```

The menu contains only two password items, setting the password or clearing the password. The password must consist of four numbers; therefore the range of passwords is from 0000 to 9999. To clear the password, you must enter the original password once. If you forget the password, you will not be able to gain access to the menu items "Define System Parameter" or "**Test Function Parameter**". You may only access the "**Display System Status**" and "**Password**" items. There is a backdoor password but it is not contained in this document. You must contact our representative or our support department and request the backdoor password.

Again, from the main Setup menu, the item "5", Reset Data to Default will clear all settings in the ETU-01A back to factory default. This may be necessary when changing operational firmware chip or if the unit exhibits strange behavior while configuring. In such cases, we recommend doing the factory reset and reconfiguring the unit as a last effort before returning a unit for factory repair.

```
<<   Reset Data to Factory Default  >>

Press "ENTER" to confirm, "ESC" to previous menu.
```

Pressing Enter again on the above screen will reset the ETU-01A to factory default. The default settings are as follows:
Master Timing = Recovery
Framing = CCS (PCM31)
CRC4 = On
Line Code = HDB3
RAI = Enabled
Idle Code = 7F
E-bit = Off
Cascade = Off
Timeslot Assignment = TS01~31 (31x64kbps or 1984kbps)

Use the ESC key to return to the Setup menu.

```
          ******************************************
          ****   CTC UNION TECHNOLOGIES CO.,LTD   ****
          ****    ETU-01A/SNMP  TERMINAL MODE     ****
          ****       SETUP MENU  VER  2.22        ****
          ******************************************

     1.  Display System Status.
     2.  Define System Parameter.
     3.  Test Function Parameter.
     4.  Password
     5.  Reset Data to Default.
     6.  EXIT

     DATE : 2008/10/14       TIME : 18:25:38


     Enter 1-6 to select function.
```

To exit the console terminal mode. press "6". The terminal connection will be dropped and the following will be displayed.

```
ETU-01A TERMINAL MODE IS DISCONNECTED
```

This completes the examples of console terminal mode operation for the ETU-01A.

Chapter 5. Loop Back and BERT Testing

5.1 General

The ETU-01A diagnostics functions include:
Status indications and messages.
User activated loop back.
Integrated Bit Error Rate Test (BERT).

The loop back tests and integrated BERT are out-of-service tests which may be activated via the user data port (utilizing the V.54 standard), the front panel LCD interface, from the console terminal menu or via SNMP (when option is installed). The ETU-01A offers bit error rate testing on both the synchronous data channel and the E1 line, using a locally generated pseudo-random sequence. To provide compatibility with other BERT equipment, you may select the pseudo-random pattern from a list of available patterns.

5.2 Status Indicators and Messages

Indicators:

The status, of the ETU-01A, is indicated by viewing the Signal Loss, Sync Loss, Alarm, Error and Test LED indicators. User data channel activity is indicated by the corresponding RD and TD LED indicators.

Table 5-1 LED indicators

Indicator	Color	Function
Power	Green	ON when power is on.
Sig Loss	Red	ON when received signal is lost.(E1 Line)
Sync Loss	Red	ON when received frame sync is lost.(E1 Line)
Alarm	Red	ON when E1 has an alarm. (Includes: BPV error / CRC4 error / Frame slip / All one / Remote alarm)
RD	Yellow	ON when SPACE is being received. Off when MARK is being received. Flashing when data is received.
TD	Yellow	ON when SPACE is being transmitted, Flashing when data is transmitted.
Error	Red	ON when BERT function is activated and detects bit errors.
Test	Red	ON when the ETU-01A is in any loop back mode or BERT function is on. Flashing when in loop back initiated by the remote unit.

Display:

The ETU-01A maintains an alarm buffer. The buffer can store an alarm event of each type below along with the time of occurrence. A maximum of 256 alarms may be stored and displayed on the front panel LCD through the **ALARM BUFFER DISPLAY** menu or the terminal connected to the Control Port. Table 5-2, below, presents the alarm messages generated by the ETU-01A.

Table 5-2 Alarm Message

Message	Description	Corrective Actions	Alarm type
POWER TURN	Power ON/OFF time.		ON/OFF
BRG1 FAILURE	The data port baud rate generator has failed. Only tested at power on.	Check the clock mode of the user data channel or Replace the ETU-01A.	ON
FIFO1 SLIP	The data port FIFO buffer suffered an overflow or underflow, usually caused by inconsistencies in clock rates.	Check the clock mode of the user data channel or Replace the ETU-01A.	ON
E1 SIG. LOSS	Loss of E1 link receive signal.	Check cable connections to the E1 line connector and the other equipment providing the link to the ETU-01A.	ON/OFF
E1 SYNC LOSS	Loss of E1 link frame sync.	Check cable connections to the E1 line connector and the other equipment providing the same frame link to the ETU-01A or Replace the ETU-01A.	ON/OFF
E1 LINK BPV	Bipolar violations in the E1 link receive signal. Updated once per second.	Check that line attenuation does not exceed that specified for E1 line. Check other equipment providing the same line code to the ETU-01A.	ON
E1 CRC4 ERR	CRC-4 errors detected in E1 link receive signal. Updated once per second.	Check other equipment providing the same frame link to the ETU-01A.	ON
E1 FRAME SLIP	E1 link frame slips are detected. Updated once per second.	Incorrect selection of master clock source or problem with the equipment connected to the remote end of the link, unstable clock source.	ON
E1 LINE AIS	E1 link receiving an all ones signal.	Problem with the equipment connected to the remote end of the link.	ON/OFF

5.3 USER Activated Loop Back.

The ETU-01A supports the following types of test loop backs.

E1 line local analog loop back.
E1 line local digital loop back.
E1 line local payload loop back.
E1 line remote analog loop back.
E1 line remote digital loop back.
Data Port local analog loop back.
Data Port local digital loop back.
Data Port V.54 remote loop back.

The user activated loop back functions are accessed from the LOOPBACK PARAMETER menu on the front panel LCD, through the **Test Function Parameter** => **Loop Back Test** menu via the console port terminal or with set commands issued by an SNMP management workstation. The available test functions are described in the following pages.

E1 line local analog loop back

The E1 line local analog loop back is performed by connecting the main link transmit signal to the input of the receive path in the Channel Service Unit (CSU), as shown in Figure 5-1. This returns the transmit signal of the Data port to the receive path of the Data port. The Data Port must receive its own transmission (not recommended for Ethernet bridge or router modules). This loop back fully tests the local ETU-01A operation and the connections to the local DTE. During this loop back, the ETU-01A E1 line sends an unframed "all ones" signal to the remote equipment. Before initiating this loop back, disconnect the LAN cable from the rear panel Ethernet Bridge interface.

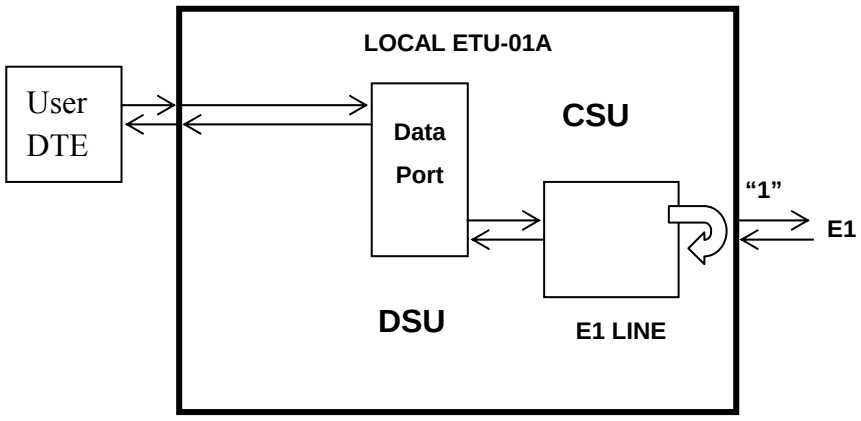


Figure 5-1. E1 link local analog loop back

E1 line local digital loop back

E1 line local digital loop back is performed by connecting the E1 link receive signal to the output of the transmit path, in the DSU. This loop back test checks the performance of the local ETU-01A, the remote ETU-01A and the connections between them, as shown in Figured 5-2.

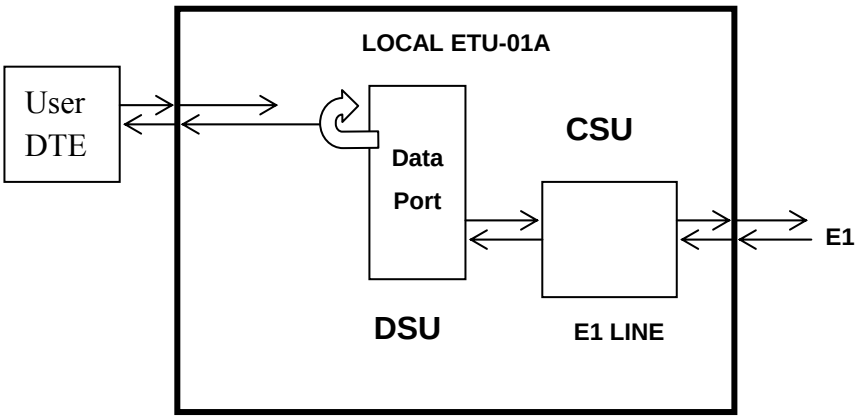


Figure 5-2. E1 link local digital loop back

E1 line local payload loop back

E1 line local payload loop back is performed by connecting the E1 link receive signal to the output of the transmit path, before the Digital Service Unit (DSU). This loop back test checks the performance of the local ETU-01A, the remote ETU-01A and the connections between them, as shown in Figured 5-3.

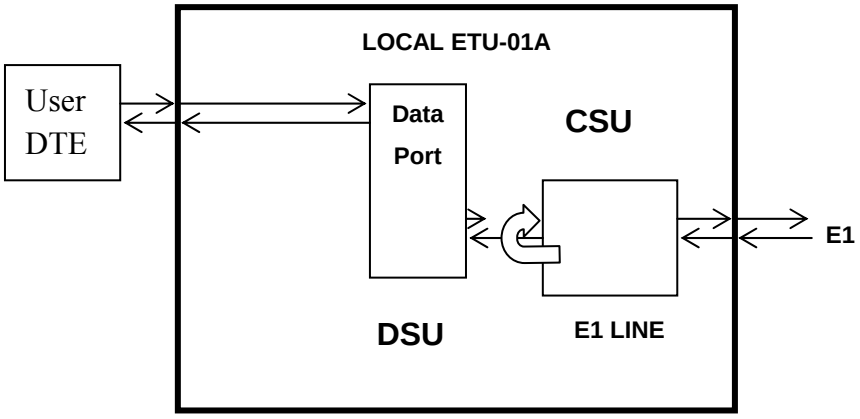


Figure 5-3. E1 link local payload loop back

E1 line remote analog loop back

E1 line remote analog loop back is performed by sending a loop back code to the remote unit. The remote unit then connects its E1 link receive signal to the output of the transmit path, before the Channel Service Unit (CSU). This loop back test checks the performance of the local ETU-01A, the remote ETU-01A and the connections between them, as shown in Figured 5-4.

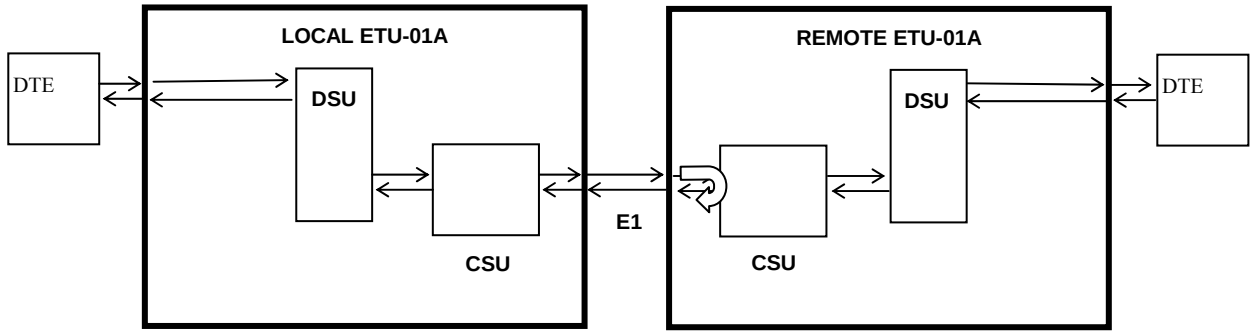


Figure 5-4. E1 link remote analog loop back

Note:

The remote loop back codes, also referred to as data link messages, for the ETU-01A utilize the 4 spare Sa bits within the framing timeslot (TS0). Therefore, any remote loop back functions, including remote analog loop back (LLB) and remote payload loop back (PLB) are only available when running in framed mode (PCM30 or PCM31). Unframed mode does not support any remote loop back functions.

E1 line remote payload loop back

E1 line remote payload loop back is performed by sending a loop back code to the remote unit. The remote unit then connects its E1 link receive signal to the output of the transmit path, before the Digital Service Unit (DSU). This loop back test checks the performance of the local ETU-01A, the remote ETU-01A and the connections between them, as shown in Figured 5-5.

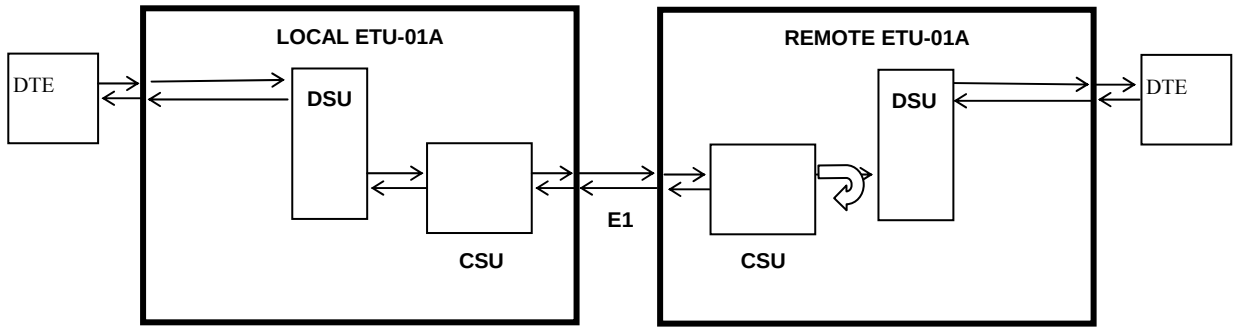


Figure 5-5. E1 link remote payload loop back

Data Port local analog loop back.

Data Port local analog loop back is performed by connecting the data channel transmit data (TD) to the input of the receive path (RD) before the CSU, as shown in Figure 5-6. The test signal is provided by the local DTE.

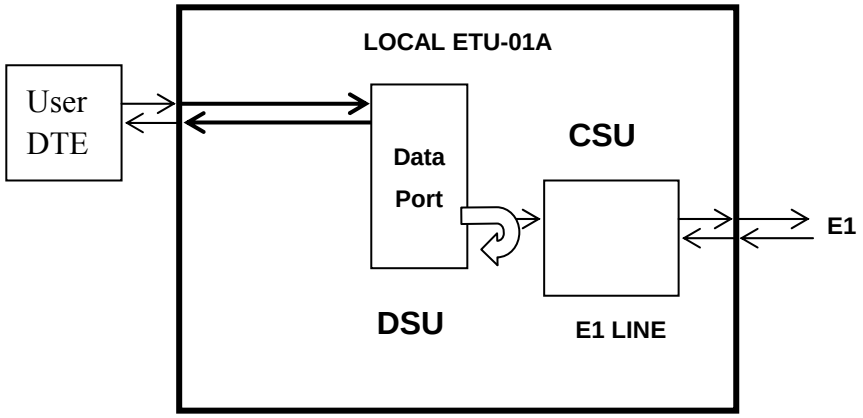


Figure 5-6. Data Port local analog loop back

Data Port local digital loop back.

Data Port local digital loop back is performed by connecting the local data channel receive data (RD) to the data channel transmit input (TD), as shown in Figure 5-7. The test signal is then provided by the local E1 or by the remote user DTE.

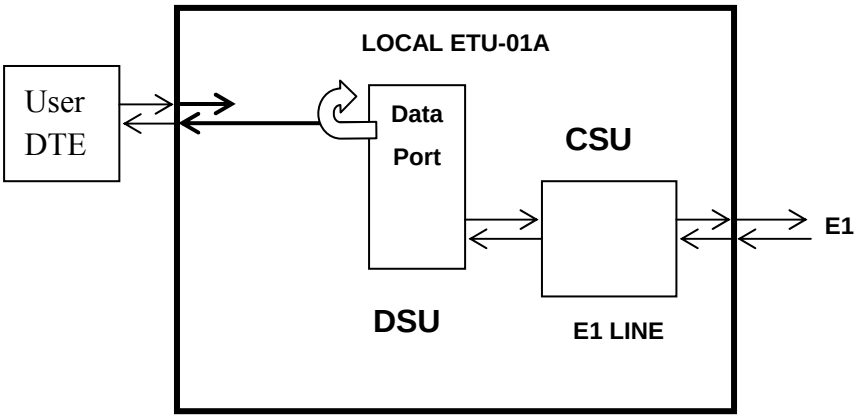


Figure 5-7. Data Port local digital loop back

Data Port V.54 remote loop back

The Data Port V.54 remote loop back is performed by sending standard V.54 loop back codes to the remote unit. The remote unit then connects its local data channel receive data (RD) to the channel transmit input (TD). This loop back test checks the performance of the local ETU-01A, the remote ETU-01A and the connections between them, as shown in Figured 5-8.

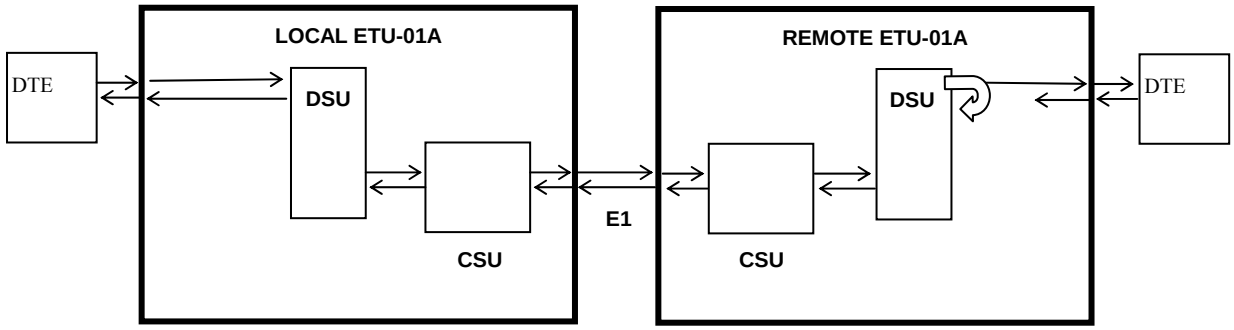


Figure 5-8. Data Port V.54 remote loop back

Integrated Bit Error Rate Test (BERT).

During Data Port BERT testing, the local DTE is disconnected and the DSR line is off. An internal pattern generator connects a user selected test pattern sequence to the transmit input of the local data channel interface. To calibrate the system, the user can inject errors at a selectable rate. The receive output is connected to a pattern tester. The tester compares the received and transmitted patterns and detects errors.

During E1 Line BERT testing, an internal pattern generator connects a user selected test pattern sequence to the transmit input of the local E1 line interface. To calibrate the system, the user can inject errors at a selectable rate. The receive output is connected to a pattern tester. The tester compares the received and transmitted patterns and detects errors.

BERT local loop back

For a local test, use the E1 Line local analog loop back (or hardwire main link RX connector to TX) or the Data Port local analog loop back, to return the data back to the local DTE, as shown in Figure 5-9.

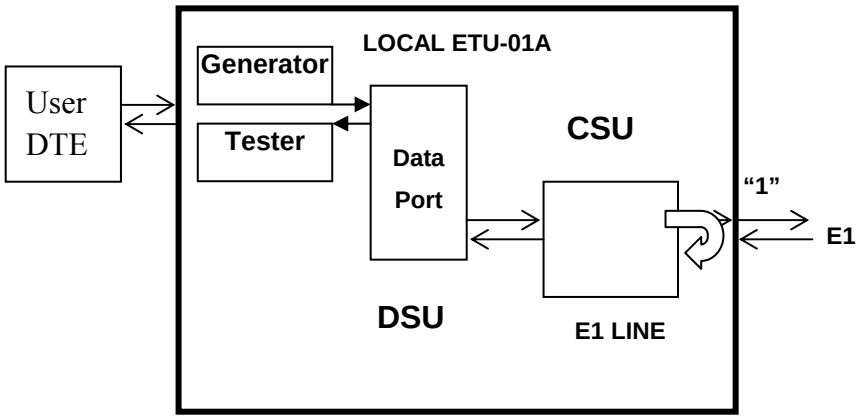
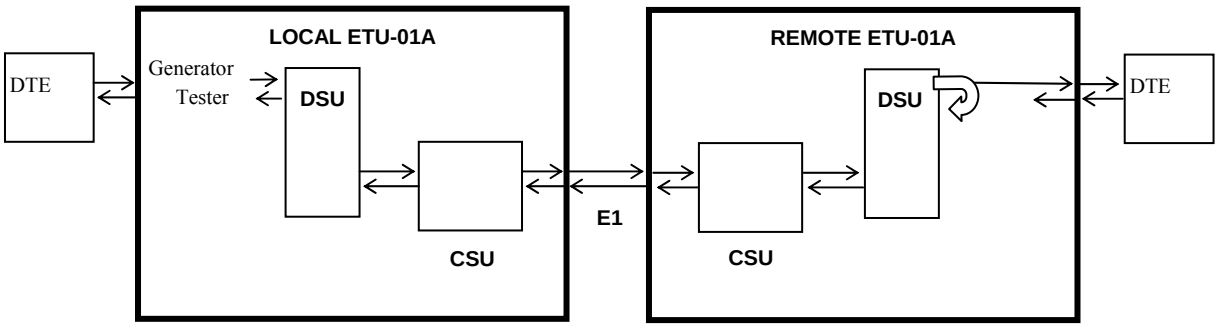


Figure 5-9. BERT for local test
(BERT on Data Port shown, E1 Link analog loop back.)

BERT for system test

For a system test, use the remote site's E1 link local digital or payload loop back or data port local digital loop back, to return the data back to the local DTE over the E1 link, as shown in Figure 5-10. Additionally, you may use the local site's E1 link remote analog, remote payload or Data Port V.54 loop back to return the data back to the local DTE.



Local Site:

E1 Link Remote analog or payload loop back; Data Port V.54 loop back (shown).

Remote Site:

E1 Link local digital (shown) or payload loop back; Data Port local digital loop back.

Figure 5-10. BERT used for system test

Chapter 6. SNMP Option

6.1 Installation

Installation of the SNMP optional feature should be performed by qualified service personnel only. As with all electronic devices that are powered from an AC line, dangerous voltages may be present inside the unit. The technician should exercise proper care and judgment. Only open the unit for service after disconnecting the unit from the power source.

This documentation will explain in detail the proper procedure for installation of the SNMP printed circuit board feature for the ETU01-A. This procedure may also require replacement of the operational firmware for older versions of the ETU01-A as the older firmware does not support the newer SNMP card functions.

6.1.1 Required tools and supplies

No.2 Philips head screwdriver
thread lock compound (such as Glyptol™)
small, flat blade screwdriver (to aid in replacing firmware IC)

6.1.2 Procedure (Please refer to the attached drawing)

Inspect the contents of the SNMP kit. It should contain one(1) SNMP card, three(3) brass standoffs, six(6) 3mm screws, MIB file on CDROM, and possibly a 32pin EEPROM.

From the rear of the unit, disconnect all power, data port, and E1 cabling from the unit. Loosen the two captive thumb-screws located on the lower left and right of the unit. Carefully slide the mother PCB out of the case and place on a flat, clean work area. (Refer to Figure 6-1: Firmware Chip Location.)

Refer to Figure 6-2, the SNMP Exploded view. Apply thread-lock to three mounting screws and attach the three brass standoffs to the main PCB as shown. The standoffs are to be located on the component side of the main PCB.

If the firmware needs to be upgraded, perform this step prior to insertion of the SNMP card. Use a flat-blade screwdriver to carefully remove the EEPROM IC from PCB location U4 (refer to Figure 6-1). Ensure that the pins of the new IC are straight, align the pins with the IC socket and carefully seat the new IC. Excessive force should not be required. Inspect all 32 pins to ensure proper seating and that no pins were inadvertently bent during insertion.

Install the SNMP pc board by aligning the pins of the SNMP card with the 20pin connector and seat the card. Ensure that no pins are bent and that all pins have been received into the connector socket on the main PCB.

Use the remaining 3mm screws to hold down the SNMP card. Do not over-tighten, just tighten snug. Apply Glyptol™ to the hold down screws at your discretion. Refer to the exploded view Figure 6-2.

If the system firmware has been replaced, a system reset will be required to initialize the system properly. Return the motherboard to the case, tighten the captive thumb-screws and re-attach all cables and power. Perform a system reset followed by re-configuration and normal loop back diagnostics. Please refer to Chapter 3 if using the LCD or Chapter 4 for serial terminal.

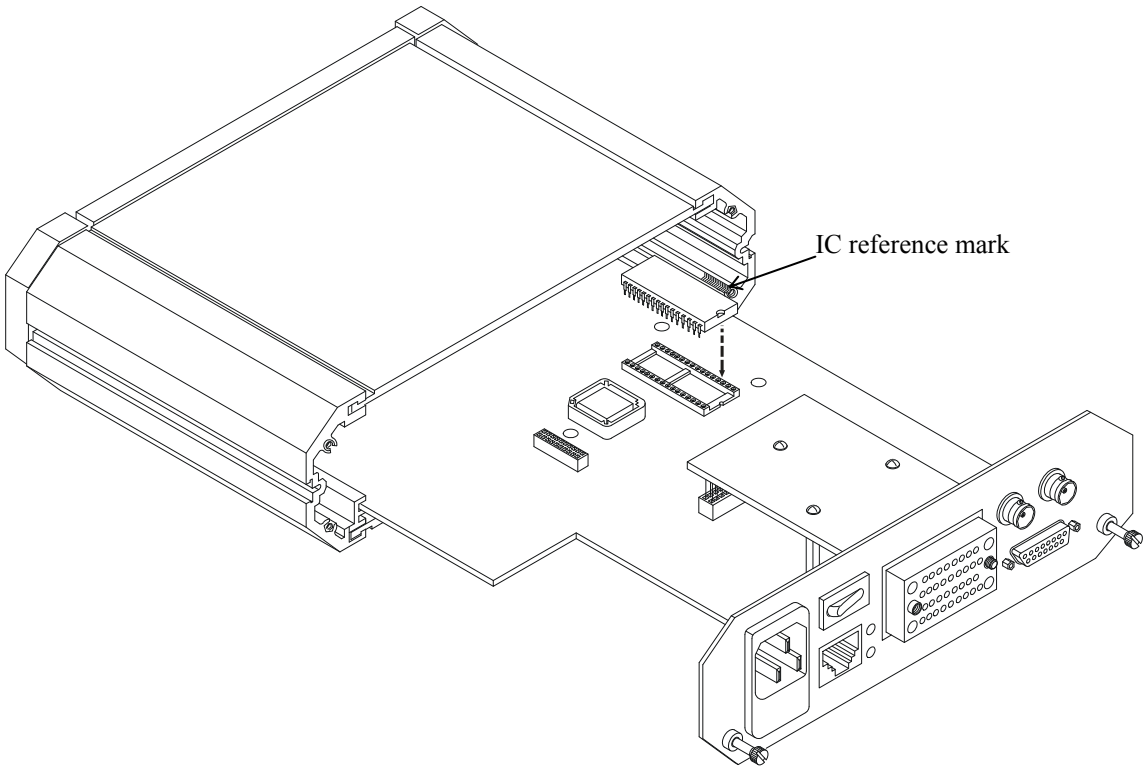


Figure 6-1: Firmware Chip Location

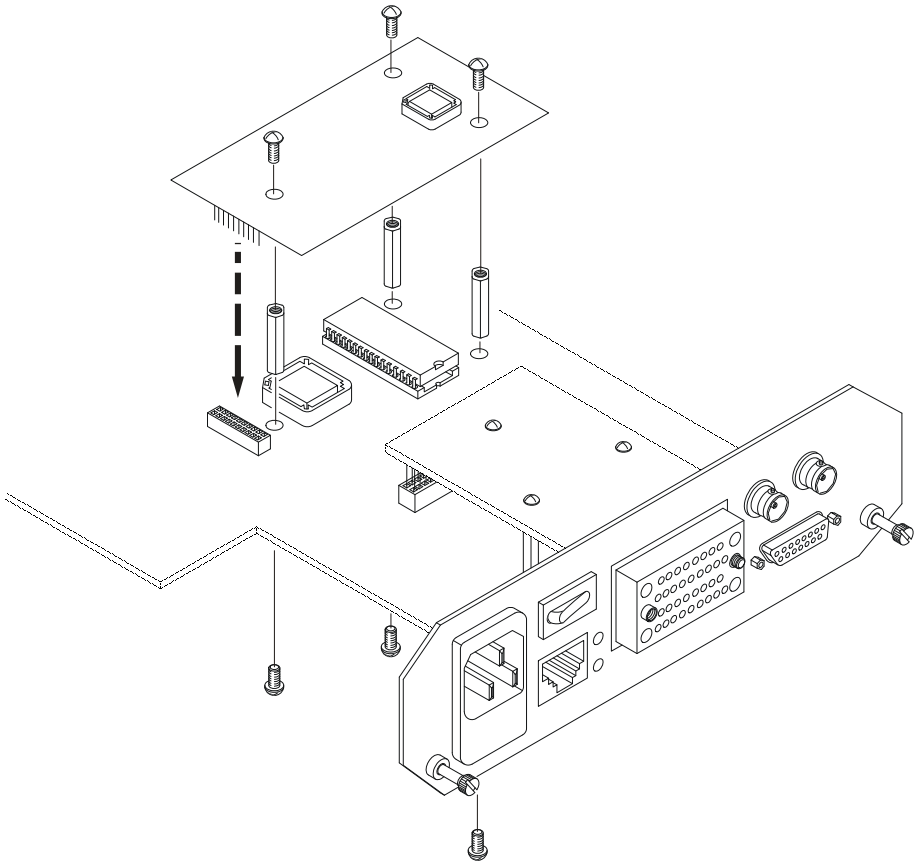


Figure 6-2: SNMP Installation Exploded View

6.2 Simple Network Management Protocol

6.2.1 SNMP Overview

The Simple Network Management Protocol (SNMP) is one of many protocols in the Internet Protocol (IP) suite. SNMP is the protocol recommended specifically for the exchange of management information between hosts residing on IP networks. Network management allows you to monitor and control network devices remotely using conventional computer network technology.

The SNMP management functions of the ETU-01A are provided by an internal SNMP agent, which utilizes out-of-band communication over standard 10/100BASE-T Ethernet. The SNMP agent is compliant with the SNMPv1/v2C/v3 standards. SNMP communication uses the User Datagram Protocol (UDP). UDP is a connectionless transport protocol, part of the IP suite. The SNMP protocol is an asynchronous command/response polling protocol and operates at the OSI Layer 7 (Layer 7 is the Application Layer. Other IP protocols that operate at this layer are FTP, Telnet, SMTP, etc.). All management traffic is initiated by the SNMP-based network management station. Only the addressed managed entity (agent) answers the polling of the management station (except for trap messages).

All functions and settings accessible via the LCD or serial terminal connection of the ETU-01A are also readable and settable via the Simple Network Management protocol.

6.2.2 SNMP Operations

The SNMP protocol includes four types of operations:

getRequest Command for retrieving specific value of an "instance" from the managed node. The managed node responds with a getResponse message.

getNextRequest Command for retrieving sequentially specific management information from the managed node. The managed node responds with a getResponse message.

getBulkRequest Command for retrieving a block of management information from the managed node. The managed node responds with a getResponse message. getBulkRequest was introduced in SNMPv2.

setRequest Command for manipulating the value of an "instance" within the managed node. The managed node responds with a getResponse message.

trap Management message carrying unsolicited information on extraordinary events (that is, events which occurred not in response to a management operation) reported by the managed node.

6.2.3 The Management Information Base

The management information base (MIB) includes a collection of managed objects. Managed objects are defined as parameters that can be managed, such as specific information on device configuring or on performance statistics values.

The MIB includes the definitions of relevant managed objects (MIB variables) for the specific node. Various MIB's can be defined for various management purposes, types of equipment, etc. The management data itself is a collection of integer, string and MIB address variables that contain all the information necessary to manage the node.

A leaf object's definition includes the range of instances (values) and the "access" rights:

Read-only	Instances of an object can be read, but cannot be set.
Read-write	Instances of an object can be read or set.
Write-only	Instances of an object can be set, but cannot be read.
Not accessible	Instances of an object cannot be read, nor set.

6.2.4 MIB Structure

The MIB has an inverted tree-like structure (root over branches), with each definition of a managed instance forming one leaf, located at the end of a branch of that tree. Each "leaf" in the MIB is reached by a unique path, therefore by numbering the branching points, starting with the top, each leaf can be uniquely defined by a sequence of numbers. The formal description of the managed objects and the MIB structure is provided in a special standardized format, called Abstract Syntax Notation 1, or ASN.1 (pronounced A-S-N dot one).

Since the general collection of MIB's can also be organized in a similar structure, under the supervision of the Internet Activities Board (IAB), any parameter included in a MIB that is recognized by the IAB is uniquely defined.

To provide the flexibility necessary in a global structure, MIB's are classified in various classes (branches), one of them being the experimental branch, another being the management (mgmt) branch, and yet another the group of private (enterprise-specific) branch. Under the private enterprise-specific branch of MIB's, each enterprise (manufacturer) can be assigned a number, which is its enterprise number. The assigned number designates the top of an enterprise-specific sub-tree of non-standard MIB's. Within this context, CTC Union has been assigned the enterprise number 4756. Under this scheme, the path to CTC Union's Enterprise branch would be:
iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).ctcu(4756)
Enterprise-specific MIB's are published and distributed by their creators, who are responsible for their contents. Specific information regarding the CTC Union's sub-tree is available from CTC Union's Research and Development Division.

The MIB supported by the ETU01-A SNMP Agent follows RFC 1213 (standard MIB-II).

6.2.5 SNMP Communities

To enable the delimitation of management domains, SNMP uses "communities". Each community is identified by a name, which is an alphanumeric string of up to 255 characters defined by the user. Any SNMP entity (this term includes both managed nodes and management stations) is assigned by its user a community name. In parallel, the user defines for each SNMP entity a list of the communities which are authorized to communicate with it, and the access rights associated with each community (this is the SNMP community name table of the entity).

In general, SNMP agents support two types of access rights:

Read-only	the SNMP agent accepts and processes only SNMP getRequest and getNextRequest commands from management stations which have a read-only community name.
Read-write	the SNMP agent accepts and processes all the SNMP commands received from a management station with a read-write community name. SNMP agents are usually configured to send traps to management stations having read-write communities.

6.3 Breakdown of MIB for ETU-01A

Branch	Leaf object	Set Parameters
0. systemEntry	0. masterTimin	0. Recovery
		1. Internal OSC
		2. DTE1 (transparent)
		3. DTE2 (external)
		4. DTE3
	1. sendMapping	
	2. remoteConfig	
1. e1LineEntry	0. frame	0. CCS
		1. CAS
		2. Unframed
	1. cRC-4	0. OFF
		1. ON
	2. casCADE	0. OFF
		1. ON
	3. idleCode	00 ~ FF
	3. rAI	0. Disable
		1. Enable
	4. lineCode	0. HDB3
		1. AMI
	5. impedance	0. 120 ohm
		1. 75 ohm
2. timeSlotEntry	tS0	0. NC
	tS1 ~ 31	1. CH 1
3. dataPortEntry	0. multiplier	0. N64
		1. N56
	1. cts	0. Always ON
		1. Follow RTS
	2. v54Loop	0. Disable
		1. Enable
	3. portType	See Text 1
	4. dataPortSpeed	See Text 2
4. loopBackEntry	0. e1Line	0. Loopback Off
		1. Local Analog
		2. Local Digital
		3. Local Payload
		4. Remote Analog
		5. Remote Paylaod
	1. dataPort	0. Loopback Off
		1. Local Analog

Branch	Leaf	Set Parameter
5. CONTROL PORT PARAMETER	0. SPEED	0. 300 bps
		1. 600 bps
		2. 1200 bps
		3. 2400 bps
		4. 4800 bps
		5. 9600 bps
		6. 19200 bps
6. ALL CHANNEL		1. Loop back Off
		2. Local Digital
		3. V.54 LOOP
7. bERTTestEntry	0. function	0. OFF
		1. ON
	1. channel	0. CH 1
		1. CH 2
		2. CH 3
		4. CH 4
		5. SL – ML
		6. SL – SL
	2. pattern	0. 511
		1. 2047
		2. 2e15-1
		3. 2e20-1
		4. QRSS
		5. 2e23-1
		6. ALL 1
		7. ALL 0
		8. 0011
		9. 3 in 24
		10. 1 in 16
		11. 1 in 8
		12. 1 in 4
	3. errIns	0. NONE
		1. SINGLE (W)
		2. 10e-1
		3. 10e-2
		4. 10e-3
		5. 10e-4
		6. 10e-5
		7. 10e-6
		8. 10e-7
	4. result	0. Bit Err See Text 3
		1. Bit Err Rate See Text 3
		2. Recount See Text 3
8. DATE & TIME DISPLAY & SET	0. DATE	See Text 4
	1. TIME	See Text 4

Branch	Leaf	Set Parameter
9. MISCELLANEOUS	0. LCD LIGHT	0. AUTO
		1. ON
		2. OFF
	1. RESET TO DEFAULT (W)	Press [ENTER] Send ASCII 13
10. ALARM BUFFER	0. DISPLAY ALARM	See Text 5
	1. CLEAR ALARM (W)	Press [ENTER] 13
11. LED Status		See Text 6

Text 1:

Data Port Type code:

0	1	2	3	4	5	6	7
Reserved	RS-232	ET10	X.21	G.703	V.35	RS-530	No Insert

Text 2:

Data Port Speed code: Unit :Kbps

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
N56	NC	56	112	168	224	280	336	392	448	504	560	616	672	728	784	840	896
N64	NC	64	128	192	256	320	384	448	512	576	640	704	768	832	896	960	1024

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
N56	952	1008	1064	1120	1176	1232	1288	1344	1400	1456	1512	1568	1624	1680	1736	2048	
N64	1088	1152	1216	1280	1344	1408	1472	1536	1600	1664	1728	1792	1856	1920	1984	2048	

Text 3:

Bert Result transfer format:

	Text 1 (9)	Text 2 (10)	Text 3 (11)	Text 4 (12)	Text 5 (13)	Text 6 (14)	Text 7 (15)	Text 8 (16)
Bit Err	Byte 5	Byte 4	Byte 3	Byte 2	Byte 1	Byte 0	X	X
Bit Err Rate	0	□	0	e	-	0	0	X

Bit Err is 48 bits , have to transfer to ASCII for display

Bit Err Rate just an ASCII text string

Text 4:

Date & Time transfer format (BCD code)

	Text 1 (9)	Text 2 (10)	Text 3 (11)	Text 4 (12)
0. DATE	Century (19-20)	Year (00-99)	Month (01-12)	Date (01-31)
1. TIME	Hour (00-23)	Minute (00-59)	Second (00-59)	

Text 5:

Alarm Buffer trap code:

Code	Error message	Error status On/Off
0	Alarm Buffer Empty	0:None
1	Power Turn	1:On 2:Off
2	Main Link Signal Loss	1:On 2:Off
3	Main Link SYNC Loss	1:On 2:Off
4	Main Link AIS	1:On 2:Off
5	Main Link RAI	1:On 2:Off
6	Main Link MRAI	1:On 2:Off
7	Main Link BPV	0:None
8	Main Link Frame Slip	0:None
9	Main Link CRC4 Error	0:None
10	Sub Link Signal Loss	1:On 2:Off
11	Sub Link SYNC Loss	1:On 2:Off
12	Sub Link AIS	1:On 2:Off
13	Sub Link RAI	1:On 2:Off
14	Sub Link MRAI	1:On 2:Off
15	Sub Link BPV	0:None
16	Sub Link Frame Slip	0:None
17	Sub Link CRC4 Error	0:None
18	Channel 1 port FIFO Slip	0:None
19	Channel 2 port FIFO Slip	0:None
20	Channel 3 port FIFO Slip	0:None
21	Channel 4 port FIFO Slip	0:None
22	Channel 1 port Baud Rate Failure	0:None
23	Channel 2 port Baud Rate Failure	0:None
24	Channel 3 port Baud Rate Failure	0:None
25	Channel 4 port Baud Rate Failure	0:None
26	End of Alarm Buffer	0:None

Alarm message Transfer format:

Text 1 (9)	Text 2 (10)	Text 3 (11)	Text 4 (12)	Text 5 (13)	Text 6 (14)	Text 7 (15)	Text 8 (16)
Message Type Code	On/Off Code	Year (BCD)	Month (BCD)	Date (BCD)	Hour (BCD)	Minute (BCD)	Second (BCD)

Text 6:

LED Status:

Parameter							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Test	Error	Sub Alarm	Sub SYNC Loss	Sub Signal Loss	Main Alarm	Main SYNC Loss	Main Signal Loss

ETU01-A SMNP Trap codes

Code	Error message	Error status On/Off
0	Alarm Buffer Empty	0:None
1	Power Turn	1:On 2:Off
2	Main Link Signal Loss	1:On 2:Off
3	Main Link SYNC Loss	1:On 2:Off
4	Main Link AIS	1:On 2:Off
5	Main Link RAI	1:On 2:Off
6	Main Link MRAI	1:On 2:Off
7	Main Link BPV	0:None
8	Main Link Frame Slip	0:None
9	Main Link CRC4 Error	0:None
11	Sub Link SYNC Loss	1:On 2:Off
18	Data port FIFO Slip	0:None
22	Data port Baud Rate Failure	0:None
26	End of Alarm Buffer	0:None

Appendix A. I/F Modules

A.1 E1 Line Connectors

A.1.1 DB-15 connector

The E1 link DB-15 connector conforms to AT&T Pub 62411. The physical interface is a 15-pin female D-Sub type connector. The alarm relay contacts also share the same connector. If you need to use these contacts, construct a custom "Y" cable.

Pin	Designation	Direction	Function
1	TTIP	From ETU-01A	Transmit data
2	FG	↔	Frame ground
3	RTIP	To ETU-01A	Receive data
4	FG	↔	Frame ground
5	--	--	--
6	--	--	--
7	Alarm relay common	--	Alarm Relay
8	Alarm relay normally open	--	Alarm Relay
9	TRING	From ETU-01A	Transmit data
10	--	--	--
11	RRING	To ETU-01A	Receive data
12	--	--	--
13	--	--	--
14	--	--	--
15	Alarm Relay normally closed	--	Alarm Relay

Table A-1 E1 DB-15 connector pin allocation

A.1.2 BNC connector

Conn.	Pin	Designation	Direction	Function
TX	Center	TTIP	From ETU01A	Transmit data
	Sleeve	TRING	↔	Signal return
RX	Center	RTIP	To ETU-01A	Receive data
	Sleeve	RRING	↔	Signal return

Table A-2 E1 BNC connector pin allocation

A.2 X.21 User Data Channel Connector

When the ETU-01A is ordered with an X.21 interface, the physical interface is a 15-pin female D-Sub type connector wired in accordance with Table A-3.

SIGNAL FUNCTION	PIN	CIRCUIT	DIRECTION	DESCRIPTION
Protective Ground	1	Shield	↔	Chassis ground. May be isolated from Signal Ground.
Signal Ground	8	G	↔	Common signal ground.
Transmitted Data	2 9	T(A) T(B)	To ETU-01A	Serial digital data from DTE.
Received Data	4 11	R(A) R(B)	Fm ETU-01A	Serial digital data at the output of the ETU-01A receiver.
Request to Sent	3 10	C(A) C(B)	To ETU-01A	A ON signal to the ETU-01A when data transmission is desired.
Data Carrier Detect	5 12	I(A) I(B)	Fm ETU-01A	Constantly ON, except when a loss of the received carrier signal is detected.
Signal Timing	6 13	S(A) S(B)	Fm ETU-01A	A transmit data rate clock for use by an external data source.
External Transmit clock	7 14	B(A) B(B)	To ETU-01A	A serial data rate clock input from the data source.
--	15	--	--	--

Table A-3 X.21 user data channel connector pin allocation

A.3 V.35 User Data Channel Connector

When the ETU-01A is ordered with a V.35 interface, the physical interface is a 34-pin female M-Block (Winchester) type connector wired in accordance with Table A-4.

SIGNAL FUNCTION	PIN	CIRCUIT	DIRECTION	DESCRIPTION
Protective Ground	A	Frame	↔	Chassis ground. May be isolated from signal ground.
Signal Ground	B	Signal Ground	↔	Common signal ground.
Transmitted Data	P S	TD(A) TD(B)	To ETU-01A	Serial digital data from DTE.
Received Data	R T	RD(A) RD(B)	From ETU-01A	Serial digital data at the output of the ETU-01A receiver.
Request to Sent	C	RTS	To ETU-01A	An ON signal to the ETU-01A when data transmission is desired.
Clear to Sent	D	CTS	From ETU-01A	Constantly ON.
Data Set Ready	E	DSR	From ETU-01A	Constantly ON, except during test loops.
Data Terminal Ready	H	DTR	To ETU-01A	Not used.
Data Carrier Detect	F	DCD	From ETU-01A	Constantly ON, except when a loss of the received carrier signal is detected.
External Transmit clock	U W	ETC(A) ETC(B)	To ETU-01A	A transmitted data rate clock input from the data source.
Transmit Clock	Y AA	TC(A) TC(B)	From ETU-01A	A transmitted data rate clock for use by an external data source.
Receive Clock	V X	RC(A) RC(B)	From ETU-01A	A received data rate clock for use by an external data source.
External Receive clock	Z BB	ERC(A) ERC(B)	To ETU-01A	A received serial data rate clock input from the DTE.
Remote Loop back	HH	RL	To ETU-01A	When on, commands ETU-01A into remote loop back, can disable by DIP sw.
Local Loop back	JJ	LL	To ETU-01A	When on, commands ETU-01A into local loop back, can disable by DIP sw.
Test Indicator	KK	TM	From ETU-01A	ON during any test mode

Table A-4 V.35 user data channel connector pin allocation

A.4 RS-530 User Data Channel Connector

When the ETU-01A is ordered with an RS-530 interface, the physical interface is a 25-pin female D-Sub type connector wired in accordance with Table A-5.

SIGNAL FUNCTION	PIN	CIRCUIT	DIRECTION	DESCRIPTION
Protective Ground	1	Frame	↔	Chassis ground. May be isolated from signal ground.
Signal Ground	7	AB	↔	Common signal ground.
Transmitted Data	2 14	BA(A) BA(B)	To ETU-01A	Serial digital data from DTE.
Received Data	3 16	BB(A) BB(B)	From ETU-01A	Serial digital data at the output of the ETU-01A receiver.
Request to Sent	4 19	CA(A) CA(B)	To ETU-01A	A ON signal to the ETU-01A when data transmission is desired.
Clear to Sent	5 13	CB(A) CB(B)	From ETU-01A	Constantly ON.
Data Set Ready	6 22	CC(A) CC(B)	From ETU-01A	Constantly ON, Except during test loops.
Data Terminal Ready	20 23	CD(A) CD(B)	To ETU-01A	DTR not used, used for a received serial data rate clock input from the DTE.
Data Carrier Detect	8 10	CF(A) CF(B)	From ETU-01A	Constantly ON, except when a loss of the received carrier signal is detected.
External Transmit clock	24 11	DA(A) DA(B)	To ETU-01A	A transmitted data rate clock input from the data source.
Transmit Clock	15 12	DB(A) DB(B)	From ETU-01A	A transmitted data rate clock for use by an external data source.
Receive Clock	17 9	DD(A) DD(B)	From ETU-01A	A received data rate clock for use by an external data source.
Remote Loopback	21	RL	To ETU-01A	When on, commands ETU-01A into remote loopback, can disable by dipsw.
Local Loopback	18	LL	To ETU-01A	When on, commands ETU-01A into local loopback, can disable by dipsw.
Test Indicator	25	TM	From ETU-01A	ON during any test mode

Table A-5 RS-530 user data channel connector pin allocation

A.5 RS-232 User Data Channel Connector

When the ETU-01A is ordered with an RS-232 interface, the physical interface is a 25-pin female D-Sub type connector wired in accordance with Table A-6.

SIGNAL FUNCTION	PIN	CIRCUIT	DIRECTION	DESCRIPTION
Protective Ground	1	AA	↔	Chassis ground. May be isolated from signal ground.
Signal Ground	7	AB	↔	Common signal ground.
Transmitted Data	2	BA	To ETU-01A	Serial digital data from DTE.
Received Data	3	BB	Fm ETU-01A	Serial digital data at the output of the ETU-01A receiver.
Request to Sent	4	CA	To ETU-01A	A ON signal to the ETU-01A when data transmission is desired.
Clear to Sent	5	CB	Fm ETU-01A	Constantly ON.
Data Set Ready	6	CC	Fm ETU-01A	Constantly ON, Except during test loops.
Data Terminal Ready	20	CD	To ETU-01A	DTR not used, used for a received serial data rate clock input from the DTE.
Data Carrier Detect	8	CF	Fm ETU-01A	Constantly ON, except when a loss of the received carrier signal is detected.
External Transmit clock	24	DA	To ETU-01A	A transmitted data rate clock input from the data source.
Transmit Clock	15	DB	Fm ETU-01A	A transmitted data rate clock for use by an external data source.
Receive Clock	17	DD	Fm ETU-01A	A received data rate clock for use by an external data source.
Remote Loopback	21	RL	To ETU-01A	When on, commands ETU-01A into remote loop back, can disable by DIPSW.
Local Loopback	18	LL	To ETU-01A	When on, commands ETU-01A into local loop back, can disable by DIPSW.
Test Indicator	25	TM	Fm ETU-01A	ON during any test mode

Table A-6 RS-232 user data channel connector pin allocation

A.6 RS-530 to RS-449 Adapter Cable

When the ETU-01A is ordered with a RS-449 interface, an RS-530 module and adapter cable provide the proper interface. The physical interface is a 37-pin male D-Sub type connector wired in accordance with Table A-7.

SIGNAL FUNCTION	RS-530 PIN	RS-449 PIN	RS-449 CIRCUIT	DESCRIPTION
Protective Ground	1	1	Frame	Chassis ground. May be isolated from signal ground.
Signal Ground	7	19,20, 37	SG,RC, SC	Common signal ground.
Transmitted Data	2 14	4 22	SD(A) SD(B)	Serial digital data from DTE.
Received Data	3 16	6 24	RD(A) RD(B)	Serial digital data at the output of the ETU-01A receiver.
Request to Sent	4 19	7 25	RS(A) RS(B)	A ON signal to the ETU-01A when data transmission is desired.
Clear to Sent	5 13	9 27	CS(A) CS(B)	Constantly ON.
Data Set Ready	6 22	11 29	DM(A) DM(B)	Constantly ON, Except during test loops.
Data Terminal Ready	20 23	12 30	TR(A) TR(B)	DTR not used, used for a received serial data rate clock input from the DTE.
Data Carrier Detect	8 10	13 31	RR(A) RR(B)	Constantly ON, except when a loss of the received carrier signal is detected.
External Transmit clock	24 11	17 35	TT(A) TT(B)	A transmitted data rate clock input from the data source.
Transmit Clock	15 12	5 23	ST(A) ST(B)	A transmitted data rate clock for use by an external data source.
Receive Clock	17 9	8 26	RT(A) RT(B)	A received data rate clock for use by an external data source.
Remote Loopback	21	14	RL	When on, commands ETU-01A into remote loop back, can disable by DIP sw.
Local Loopback	18	10	LL	When on, commands ETU-01A into local loop back, can disable by DIP sw.
Test Indicator	25	18	TM	ON during any test mode

Table A-7 RS-530 to RS-449 pin allocation

A.7 G.703/64K Co-directional Connector

When the ETU-01A is ordered with a G.703/64K interface, the physical interface is a 15-pin female D-Sub type connector wired in accordance with Table A-8.

SIGNAL FUNCTION	PIN	DIRECTION	DESCRIPTION
Protective Ground	4 10	↔	Chassis ground. May be isolated from Signal Ground.
Signal Ground	8	↔	Common signal ground.
Transmitted Data	3 11	To ETU-01A	Serial Codirectional data from DTE.
Received Data	1 9	Fm ETU-01A	Serial Codirectional data at the output of the ETU-01A receiver.

Table A-8 G.703/64K Codirectional pin allocation

A.8 G.703/NRZ

When the ETU-01A is ordered with an NRZ interface, the physical interface is 4 BNC female connectors wired in accordance with Table A-9.

Specifications:
Line Code: NRZ
Impedance: 50 ohms
Signal Level: Logic "1": 0V +/- 0.3V
Logic "0": -1.5V +/- 0.3V
Speed: 2048K Max.

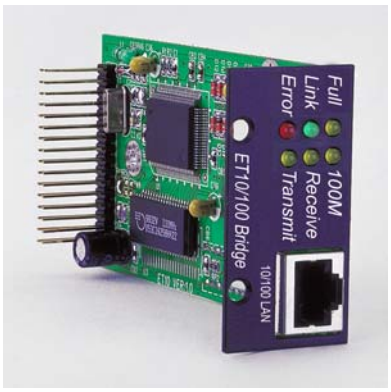
SIGNAL FUNCTION	DIRECTION	DESCRIPTION
Received Data	Fm ETU-01A	Serial NRZ data at the output of the ETU-01A receiver.
Received Timing	Fm ETU-01A	Serial NRZ timing at the output of the ETU-01A receiver.
Transmitted Data	To ETU-01A	Serial NRZ data from DTE.
Transmit Timing	To ETU-01A	Serial NRZ timing from DTE.

Table A-9 NRZ/BNC pin allocation

Settings: (by adjustment of jumpers on interface card)
Rx timing; "Normal" or "Inverted"
Tx timing; "Normal" or "Inverted"

A.9 ET100 10/100BASE-TX Ethernet Bridge Interface

When the ETU-01A is ordered with an ET100 Interface, the unit is not only an access unit for E1, but also becomes a high performance WAN bridge for 10/100Base-TX **Ethernet over E1**. The physical interface for ET100 is a RJ-45 connector.



MDI	MDI-X
1. Tx +	1. Rx +
2. Tx -	2. Rx -
3. Rx +	3. Tx +
6. Rx -	6. Tx -

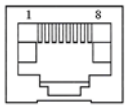


Table A-10 ET100 pin allocation

DIP Switch Settings

DIP	State		Function
1	ON*		Enable MAC filtering
	OFF		Disable Filtering (repeater)
2	ON		Enable 802.3x flow control
	OFF*		Disable 802.3x flow control
3	ON		NO Auto-negotiation
	OFF*		Auto-negotiation
4	ON		Half Duplex1
	OFF*		Full Duplex1
5	ON		10BASE-T LAN speed1
	OFF*		100BASE-TX LAN speed1
6	ON		Enable Auto MDIX
	OFF*		MDI (1:1 to HUB)
7 | 8	OFF	OFF	Memory configuration #1
	ON	OFF	Memory configuration #2
	OFF	ON	Memory configuration #3
	ON	ON	Reserved

Table A-11 DIP switch settings

* factory default settings

1 no effect when sw3 is off (auto-negotiation is on)

LED Indicators

Designation	Indication
Full (yellow)	ON=Full Duplex
Link (green)	ON=LAN Link
Error (red)	ON=LAN Error
100M (yellow)	ON=Fast Ethernet
Receive (yellow)	ON=LAN Rx data
Transmit(yellow)	ON=LAN Tx data

Table A-12 LED indicators

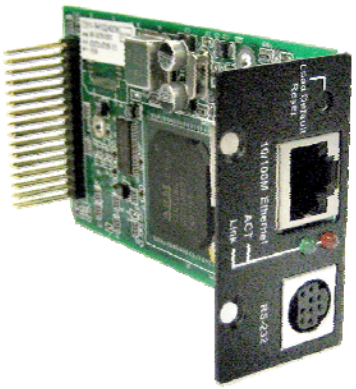
Memory configuration detail

#1 LAN to WAN 308 packets, WAN to LAN 32 packets

#2 LAN to WAN 170 packets, WAN to LAN 170 packets

#3 LAN to WAN 32 packets, WAN to LAN 308 packets

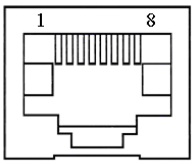
A.10 ET100R 10/100Base-TX Ethernet Router

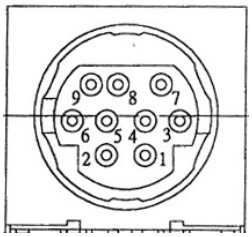


When the ETU-01A is ordered with an ET100R Interface, the unit is not only an access unit for E1, but also becomes a high performance router for 10Base-T or 100Base-TX Ethernet LAN connection. The ET100R utilizes standard pin out on one RJ-45 connector, providing connection to Ethernet (10Base-T) or Fast Ethernet (100Base-TX) networks over UTP (unshielded twisted pair) cabling.

Configuration of the router is beyond the scope of this manual. Please refer to the CDROM based instructions that are included with the router module. The ET100R router module is configured with the CLI Telnet or Web based GUI. The user manual and quick start guide are included on the CDROM. Alternately the router may be configured via the RS-232 console port. A special cable must be used to connect to the modules DIN connector. Pinouts are provided below for reference.

MDI
1. Tx +
2. Tx -
3. Rx +
6. Rx -





RS-232
DCE

PIN	Circuit	Direction	Description
1	NC		
2	RD	OUT	Receive data
3	TD	IN	Transmit data
4	DTR	IN	Data Terminal Ready
5	GND		Signal ground
6	DSR	OUT	Data Set Ready
7	RTS	IN	Request to Send
8	CTS	OUT	Clear to Send
9	NC		

Table C-9 Console port, RS-232, pin allocation

Specifications

CPU

Hi-Perf. 32 bit ARM 9 RISC CPU

Network Protocols

TCP/IP, DHCP, ARP, PPP, HDLC, Cisco HDLC, NAT (SNAT, DNAT)

Routing Protocols

Static, RIP I, RIP II

DTE Baud rate

Synchronous ≤ 2M bps

WAN Support

T1/E1

LAN Support

10Base-T / 100Base-TX, Auto MDIX

Memory

32M bytes SDRAM
8M bytes Flash Memory

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Appendix B. Performance Monitoring

The ETU-01A includes a performance monitor feature. The contents of the monitor may be viewed via the front panel LCD, through a terminal connected to the control port or via optional SNMP.

B.1 General

This section describes the performance evaluation and monitoring functions provided by the ETU-01A for the E1 link.

The functions actually available depend on the state of the CRC-4 function:

CRC-4 Enabled: when the CRC-4 function enabled is used, it is possible to monitor the end-to-end data transmission performance. The error detection information is derive from the data payload, by performing a cyclic redundancy check (CRC). The resulting CRC checksum is transmitted in addition to the raw data bits. The receiving end recalculates the checksum and compares the results with the received checksum. Any difference between the two checksums indicates that one or more bit errors are contained in the current data block being evaluated.

CRC-4 Disabled: in this case, the ETU-01A does not support the capabilities listed above. However, the ETU-01A now becomes capable of providing statistics for bipolar violations (BPV).

B.2 Performance Monitoring

When the CRC-4 function enabled, the ETU-01A stores El line statistics for the E1 link interface. This permits real-time monitoring of data transmission performance.

The performance parameters statistics are listed below:

Current CRC-4 error events (CRC Cnt)

A CRC-4 error event is any multiframe containing a CRC error event. The number of CRC events in the current second are collected in the current CRC error events register. The register is updated every second.

NoteRegister contents can be displayed at any time from the LCD, a connected console, or via SNMP. When the CRC error events are displayed on the front-panel LCD, the register can be reset by pressing ENTER when the RESET menu item is displayed.

When the CRC-4 function is disabled, the ETU-01A will be able to detect bipolar violations and store them in a register for 1 second.

Bipolar violations (BPV Cnt) count (BPV last second)

The total number of bipolar violations counted in the last second. This number is updated every second.

The remaining performance monitor data is available whether CRC-4 is enabled or not.

Current errored seconds (ES)

An errored second is any second containing one or more CRC error events, or one or more controlled slip events. The data is collected for the current 15-minute interval.

Current unavailable seconds (UAS)

An unavailable second is any second in which a failed signal state exists.. The data is collected for the current 15-minute interval.

Long-term errored seconds (LONG ES)

The total number of ES in the current powered-up interval.

Long-term fail seconds (LONG UAS)

The total number of UAS in the current powered-up interval.

Current seconds (CURR SEC)

The number of seconds in the current measurement interval. A measurement interval has 900 seconds (15 minutes).

Long term interval (LONG SEC)

The number of 15-minute intervals in the powered-up period.

Performance Monitor Brief Table

Display	Description	Range
BPV Cnt	The total number of BPV errors during the last second. The display is updated every second. CRC-4 must be disabled.	0-65535
CRC4 Cnt	The number of CRC error events recorded during the last second. The display is updated every second. CRC-4 must be enabled.	0-1024
CURR ES	Number of ES measured during the current 15-minute interval. The display is updated every second.	0-900
CURR UAS	Number of UAS measured during the current 15-minute interval. The display is updated every second.	0-900
LONG ES	Number of ES measured during the current powered-on interval. The display is updated every 15 minutes.	0-65535
LONG UAS	Number of UAS measured during the current powered-on interval. The display is updated every 15 minutes.	0-65535
CURR SEC	The time in seconds that expired from the start of the current 15-minute interval. The display is updated every second.	0-900
LONG SEC	The number of 15-minute intervals that expired from the start of the current powered-on interval. The display is updated every 15 minutes.	0-65535

Appendix C. Rack Mounting Option

All Standalone/Rack Series units have the option of adding standard EIA 19" rack mount capability. Two rack mount options provide for either mounting a single unit (half space) in a rack or for mounting two units in tandem (full space). In either situation, one standard rack unit space is required. Each rack mount kit provides all the necessary hardware for a complete installation.

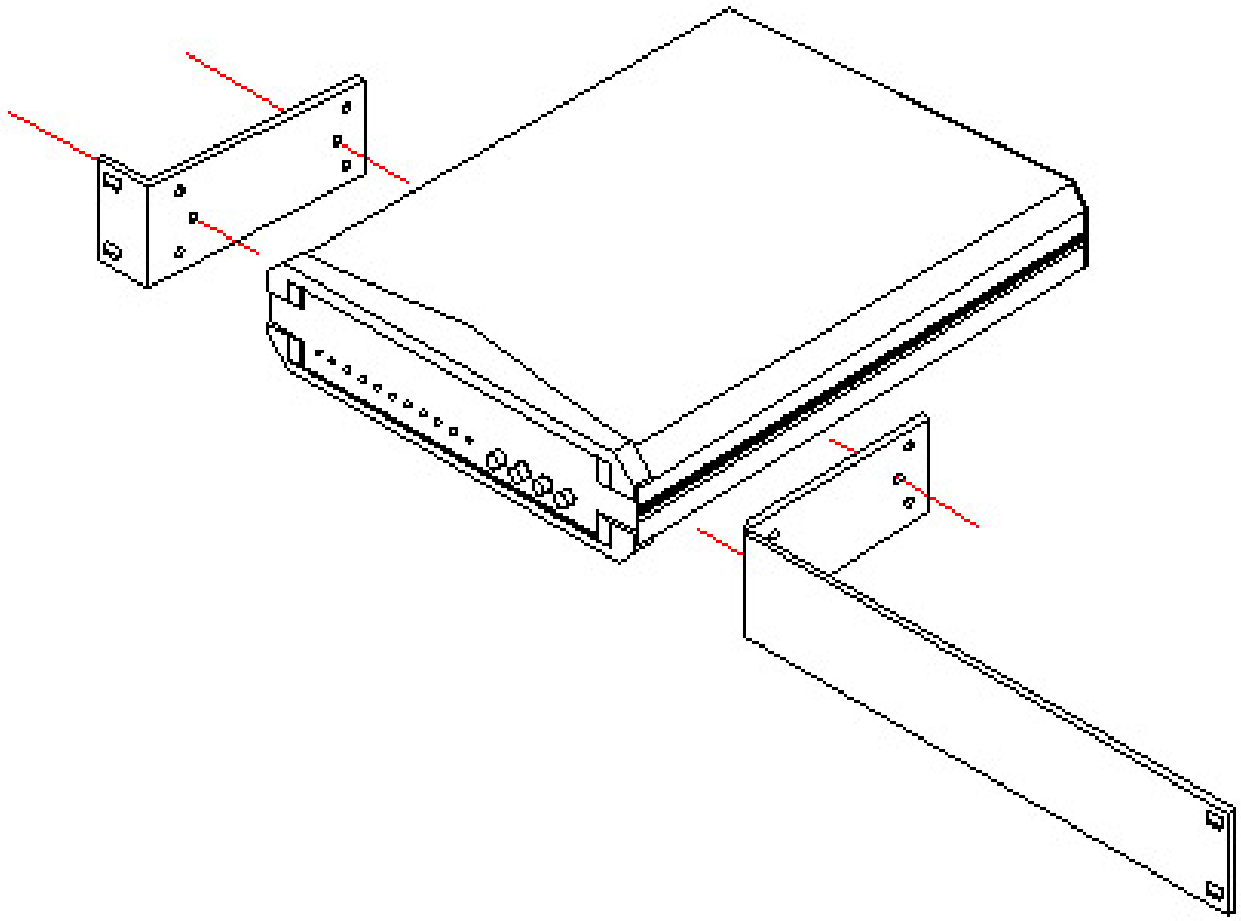

Figure C-1: Rack Mount Installation, ETU01-SS.

In single unit installations, the unit may be placed in the left or right side position simply by reversing the rack mounting brackets. The kit includes, one (1) short and one (1) long rack adapter, four (4) 3x8mm self-tapping screws, and four (4) #12-24x0.5" screws.

In order to save rack mount space, units may be mounted in tandem. Please refer to the following drawing examples for this application.

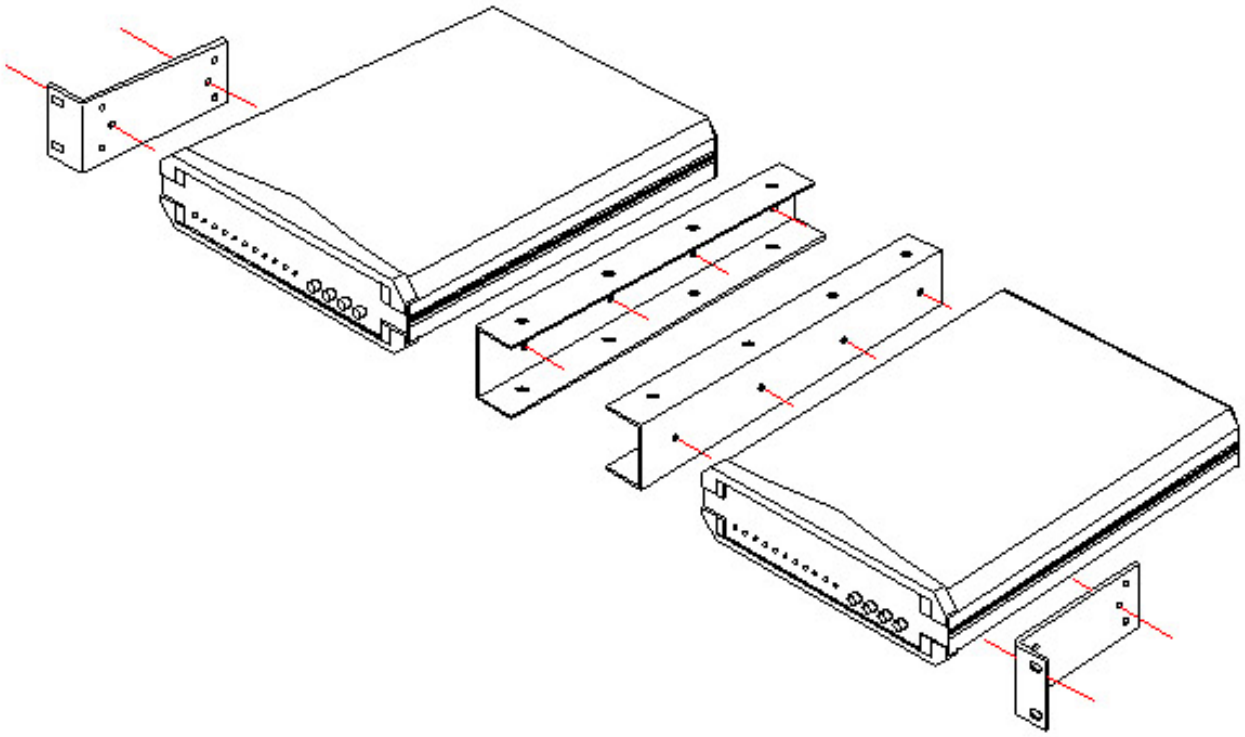

Figure C-2: Tandem Units Mounting (Exploded)

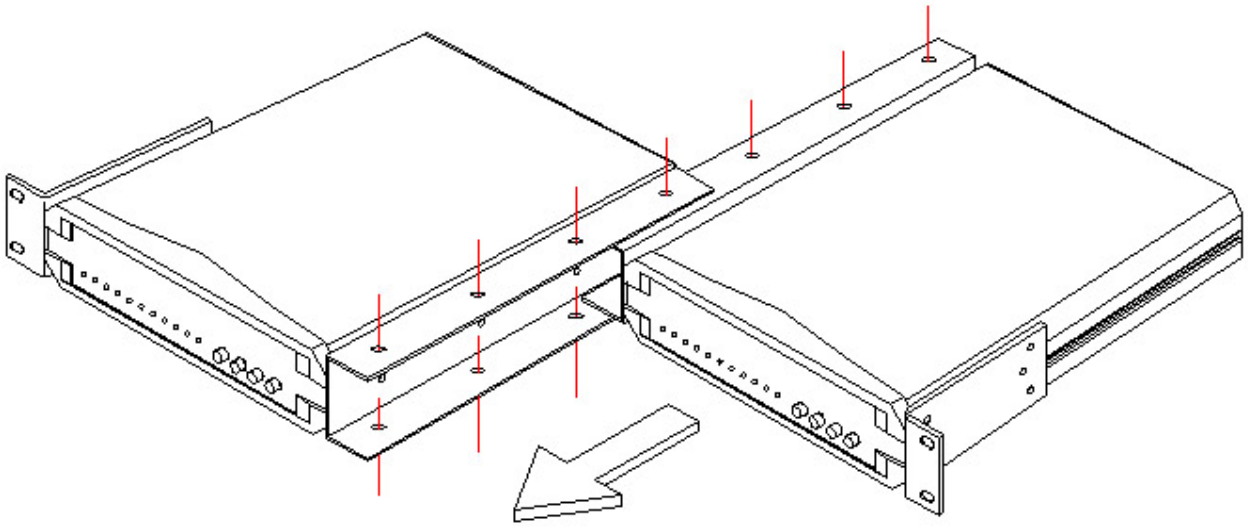

Figure C-3: Tandem Units Mounting Detail

The tandem kit includes two (2) rack mount adapters, one (1) each of inner and outer central mounting adapters, twenty (20) 3x8mm self-tapping screws, and four (4) #12-24x0.5" screws.

NOTES:

NOTES:

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Taipei, Taiwan

Attn : Technical Support Division
From Company: _____
Name: _____
Tel: ( ) _____
Fax:( ) _____
MODEL: ☐ ETU-01A/AC ☐ ETU-01A/DC
ACTIVITY: As attached in DIP and configuration setting table
SYS CONFIGURATION:

Technical Inquiry Form

MODEL No.: ☐ ETU-01A/AC ☐ ETU-01A/DC

Please fill in the configuration settings with '✓' marks into the following table. Send it to us by fax, and we will reply to you immediately.

	FUNCTION	Parameter	Your setting	Suggested
	System Parameter			
	Master Timing	RECOVERY		
		INT OSC		
		DTE1		
		DTE2		
		DTE3		
	E1 Line			
	Frame	UNFRAMED		
		CCS		
		CAS		
	CRC-4	OFF		
		ON		
	CASCADE	OFF		
		ON		
	IDLE CODE	7E		
		00~FF		
	RAI	DISABLE		
		ENABLE		
	LINE CODE	HDB3		
		AMI		
	IMPEDANCE	75		
		120		
	TIMESLOT MAPPING	1~15, 17~31		
	DATAPORT			
	TYPE (RS530,V35,ET10 etc)	Type		
	MULTIPLIER	N64		
		N56		
	CTS	ON		
		RTS		
	V.54 LOOP	OFF		
		ON		
	LOOPBACK			
	E1 LINE	OFF		
		LOCAL		
		REMOTE		
	DATA PORT	OFF		
		LOCAL		
		REMOTE		
	BERT TEST			
	FUNCTION	OFF		
		E1		
		DATAPORT		

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